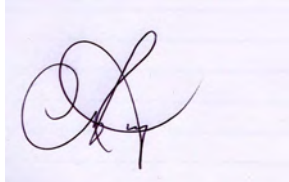


# POST MEETING REPORT

1. Meeting Number:	<b>IAU Symposium 278</b>
2. Meeting Title:	<b>Archaeoastronomy and Ethnoastronomy: Building Bridges between Cultures (Ninth "Oxford" International Symposium on Archaeoastronomy)</b>
3. Co-ordinating Division:	<b>Division XII</b>
4. Dedication of meeting	<b>None</b>
5. Location	<b>Lima, Peru</b>
6. Dates of meeting:	<b>Jan 5–14, 2011</b>
7. Number of participants:	<b>120</b>
8. List of represented countries:	<b>Argentina, Australia, Austria, Bolivia, Brazil, Canada, Chile, Colombia, Czech Republic, Egypt, Italy, Japan, Mexico, New Zealand, Nigeria, Peru, Poland, Spain, Switzerland, Thailand, UK, USA</b>
9. Report submitted by:	<b>Clive Ruggles</b>
10. Date and place:	<b>Leicester, Feb 7, 2011</b>
11. Signature of SOC Chair:	

## ATTACHED DOCUMENTS

APPENDIX I — Final scientific programme

APPENDIX II — List of participants

APPENDIX III — List of recipients of IAU grants

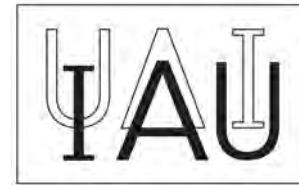
\*\*\*NB The receipts signed by the recipients of IAU Grants were sent by post on Feb 2, 2011

APPENDIX IV — Brief report to the Executive Committee

An on-line form has been submitted for "Women in Astronomy" statistics.



**“OXFORD IX”**  
**IAU SYMPOSIUM 278**



NINTH “OXFORD” INTERNATIONAL SYMPOSIUM ON ARCHAEOASTRONOMY  
NOVENO SIMPOSIO INTERNACIONAL “OXFORD” SOBRE ARQUEOASTRONOMÍA  
NONO SIMPÓSIO INTERNACIONAL “OXFORD” SOBRE ARQUEOASTRONOMIA

**Archaeoastronomy and Ethnoastronomy:  
Building Bridges between Cultures**

**Arqueoastronomía y Etnoastronomía:  
Construyendo Puentes entre Culturas**

**Arqueoastronomia e Etnoastronomia:  
Construindo Pontes entre Culturas**

LIMA, PERÚ, 2011



# PROGRAMME PROGRAMA



*Sunrise at Chankillo. © Ivan Ghezzi*

## OVERALL SCHEDULE OF EVENTS

### *Tuesday, January 4*

<b>Time</b>	<b>Event</b>	<b>Venue*</b>
14:00–18:00	Registration desk open	CCPB

### *Wednesday, January 5*

08:00–17:30	Registration desk open	CCPB
09:00–10:45	MAIN CONFERENCE OPENING SESSION	CCPB
10:45–11:30	Coffee and posters	CCPB
11:30–13:00	MAIN CONFERENCE SESSION	CCPB
13:00–15:00	Lunch	
15:00–16:45	MAIN CONFERENCE SESSION	CCPB
16:45–17:15	Coffee and posters	CCPB
17:15–19:00	MAIN CONFERENCE SESSION	CCPB
20:00–	Welcoming reception at the CCPB (accompanying people welcome)	CCPB

### *Thursday, January 6*

08:30–17:30	Registration desk open	CCPB
09:00–10:45	MAIN CONFERENCE SESSION	CCPB
10:45–11:15	Coffee and posters	CCPB
11:30–13:00	MAIN CONFERENCE SESSION	CCPB
13:00–15:00	Lunch	
15:00–16:45	MAIN CONFERENCE SESSION	CCPB
16:45–17:15	Coffee and posters	CCPB
17:15–19:00	MAIN CONFERENCE SESSION	CCPB
20:00	Welcoming reception at the PUCP (accompanying people welcome)	CCPU
21:00	Public lecture by Gary Urton (see page 9)	CCPU

**\*Venues:**

CCPB	Centro Cultural Peruano Británico, Bellavista 531, Miraflores
CAPC	Casa Andina Private Collection hotel, Av. La Paz 463, Miraflores. See conference website for map
CCPU:	Centro Cultural of the Pontificia Universidad Católica del Perú, Av. Camino Real 1075, San Isidro
PUCP :	Main campus of the PUCP, Av. Universitaria 1801, San Miguel. Building H, Rooms 103/104/205
RHP:	Restaurant Huaca Pucllana, General Borgoño Cdra. 8, Miraflores

**Friday, January 7**

<b>Time</b>	<b>Event</b>	<b>Venue*</b>
08:30–11:00	Registration desk open	CCPB
09:00–10:30	MAIN CONFERENCE SESSION	CCPB
10:30–11:00	Coffee	CCPB
11:00–19:00	Excursion to Puruchuco	
20:00–	Folklore event	CCPB

**Saturday, January 8**

08:30–17:30	Registration desk open	CCPB
09:00–10:30	MAIN CONFERENCE SESSION	CCPB
10:30–11:00	Coffee and posters	CCPB
11:00–13:00	MAIN CONFERENCE SESSION	CCPB
13:00–15:00	Lunch	
15:00–16:30	MAIN CONFERENCE SESSION	CCPB
16:30–17:00	Coffee and posters	CCPB
17:00–19:00	MAIN CONFERENCE SESSION	CCPB
20:00–	Conference banquet	RHP

**Sunday, January 9**

08:30–17:30	Registration desk open	CCPB
09:00–10:45	MAIN CONFERENCE SESSION	CCPB
10:45–11:15	Coffee and posters	CCPB
11:15–13:00	MAIN CONFERENCE SESSION	CCPB
13:00–15:00	Lunch	
15:00–16:15	MAIN CONFERENCE SESSION	CCPB
16:15–16:45	Coffee and posters	CCPB
16:45–19:00	MAIN CONFERENCE CLOSING SESSION	CCPB
19:00–22.00	Reception and cocktail provided by the Instituto Peruano de Astronomía	CAPC

**Monday, January 10 – Tuesday, January 11**

**EXCURSION TO THE CASMA AREA**

**\*Venues:** see page 3

***Wednesday, January 12***

<b>Time</b>	<b>Event</b>	<b>Venue*</b>
08:30–17:30	Registration desk open	PUCP
09:00–10:30	INTRODUCTORY WORKSHOP	PUCP
10:30–11:00	Coffee and posters	PUCP
11:00–13:00	REGIONAL MEETING SESSION	PUCP
13:00–15:00	Lunch	
15:00–16:00	REGIONAL MEETING SESSION	PUCP
16:00–16:30	Coffee and posters	PUCP
16:30–18:30	REGIONAL MEETING SESSION	PUCP

***Thursday, January 13***

08:30–17:30	Registration desk open	PUCP
09:00–10:30	INTRODUCTORY WORKSHOP	PUCP
10:30–11:00	Coffee and posters	PUCP
11:00–13:00	REGIONAL MEETING SESSION	PUCP
13:00–15:00	Lunch	
15:00–16:30	REGIONAL MEETING SESSION	PUCP
16:30–17:00	Coffee and posters	PUCP
17:00–18:30	REGIONAL MEETING SESSION	PUCP

***Friday, January 14***

08:30–17:30	Registration desk open	PUCP
09:00–10:30	INTRODUCTORY WORKSHOP	PUCP
10:30–11:00	Coffee and posters	PUCP
11:00–13:00	REGIONAL MEETING SESSION	PUCP
13:00–15:00	Lunch	
15:00–16:30	REGIONAL MEETING WORKSHOP	PUCP
16:30–17:00	Coffee and posters	PUCP
17:00–18:30	REGIONAL MEETING WORKSHOP	PUCP

***Saturday, January 15 – Tuesday, January 18***

POST-CONFERENCE TOUR — INCA ARCHAEOASTRONOMY

**\*Venues:** see page 3

# SCIENTIFIC PROGRAMME

## PROGRAMA CIENTÍFICO

**MAIN CONFERENCE DAY 1 (WEDNESDAY JANUARY 5): 09:00–10:00**

### Opening Session

- 09:00 Welcoming address on behalf of the Anglo-Peruvian Cultural Association by Cecilia Bentín de Cruchaga, President of the Executive Council
- 09:15 Welcoming address on behalf of the Pontificia Universidad Católica del Perú by Dr Efraín Gonzales de Olarte, Academic Vice-rector
- 09:30 Welcoming address on behalf of the International Astronomical Union by Professor Clive Ruggles, President of Commission 41 (History of Astronomy)
- 09:45 Welcoming address on behalf of the International Society for Archaeoastronomy and Astronomy in Culture by Dr Stanislaw Iwaniszewski, President of ISAAC

### Apertura

- 09:00 Discurso de Bienvenida en representación de la Asociación Cultural Peruano Británica por Cecilia Bentín de Cruchaga, Presidenta del Consejo Directivo del Británico
- 09:15 Discurso de Bienvenida en representación de la Pontificia Universidad Católica del Perú por Dr Efraín Gonzales de Olarte, Vicerector Académico
- 09:30 Discurso de Bienvenida en representación de la Unión Astronómica Internacional por Profesor Clive Ruggles, Presidente de la Comisión 41 (Historia de la Astronomía)
- 09:45 Discurso de Bienvenida en representación de la Sociedad Internacional para la Arqueoastronomía y Astronomía Cultural por by Dr Stanislaw Iwaniszewski, Presidente de ISAAC

**MAIN CONFERENCE DAY 1 (WEDNESDAY JANUARY 5): 10:00–13:00**

**General themes**

**Session chair: Johanna Broda (Mexico)**

- 10:00 **Opening keynote address** Pushing back the frontiers or still running around the same circles? ‘Interpretative archaeoastronomy’ thirty years on *Clive Ruggles (UK)* **O-1**
- 10:45 COFFEE AND POSTERS (P–1 to P–16)
- 11:30 **Invited keynote address** The two cultures of Archaeoastronomy and the History of Science *Stephen McCluskey (USA)* **O-2**
- 12:15 The sky as a social field *Stanislaw Iwaniszewski (Mexico)* **O-3**
- 12:45 General discussion

13:00 – 15:00 LUNCH

**MAIN CONFERENCE DAY 1 (WEDNESDAY JANUARY 5): 15:00–19:00**

**Ethnoastronomy: Case studies from South America and Australia**

**Session chair: Stanislaw Iwaniszewski**

- 15:00 **Invited keynote address** What can the study of astronomy contribute to anthropology? An Andean perspective *Gary Urton (Harvard University, USA)* **O-4**
- 15:45 Palabras nuevas para viejos cielos: Formas recientes del discurso cosmológico entre aborígenes del Chaco argentino *Alejandro López (Argentina)* **O-5**
- 16:15 Juventud y vejez de Dapi’chi (Pléyades): las heladas, los claveles del aire y los guerreros *Cecilia Paula Gómez (Argentina)* **O-6**
- 16:45 COFFEE AND POSTERS (P–1 to P–16)
- 17:15 Ticuna knowledge, worecū stars and sky movements *Priscila Faulhaber (Brazil)* **O-7**
- 17:45 Interpretations of the Pleiades in Australian Aboriginal astronomies *Dianne Johnson (Australia)* **O-8**
- 18:15 Australian Aboriginal astronomy: transient celestial phenomena *Duane Hamacher and Ray Norris (Australia)* **O-9**
- 18:45 General discussion



**MAIN CONFERENCE DAY 2 (THURSDAY JANUARY 6): 09:00–13:00**

**Archaeoastronomy: Case studies from South America  
and Mesomerica**

**Session chair: Alejandro López**

- 09:00 **Invited student keynote address** Astronomía sub-tropical en los Andes Meridionales: el concepto de ushnu, la observación del cielo y la apropiación cultural del entorno a través de una variante del sistema de ceques en Atacama, Norte de Chile **O-10**  
*Ricardo Moyano (Mexico)*
- 09:45 La organización espacial-calendárica y los observatorios astronómicos de Tambokancha-Zurite y Huánuco Pampa, dos asentamientos Inka como centro de Paisaje Sagrado en los Andes Centrales **O-11**  
*Jose Luis Pino Matos (Peru)*
- 10:15 Machu Picchu and the Milky Way: astronomy, ritual and imperial strategy in the Inka heartland **O-12**  
*James Farmer (USA)*
- 10:45 COFFEE AND POSTERS (P-1 to P-16)
- 11:15 Can nature align? The enigma of Moxos' Lagoons, astronomy and landscape in south-western Amazonia **O-13**  
*Juan Antonio Belmonte and Josep Barba (Spain)*
- 11:45 Contributions to the study of the Muisca calendar **O-14**  
*Manuel Arturo Izquierdo (Canada)*
- 12:15 General discussion

13:00 – 15:00 LUNCH

**MAIN CONFERENCE DAY 2 (THURSDAY JANUARY 6): 15:00–19:00**

**The 2012 Phenomenon:  
Maya Calendar, Astronomy, and Apocalypticism  
in the Worlds of Scholarship and Global Popular Culture**

*Session organized by John B. Carlson (Center for Archaeoastronomy and the University of Maryland, College Park, Maryland, USA) and Mark Van Stone (Southwestern College, Chula Vista, California, USA)*

- 15:00 Introduction to the session *John B. Carlson & Mark Van Stone (USA)*
- 15:45 It's not the End of the World: emic evidence for local diversity in the Maya Long Count **O-16**  
*Mark Van Stone (USA)*
- 16:15 Cosmogony and prophecy: Maya Era Day cosmology in the context of the 2012 prophecy **O-17**  
*Carl Callaway (Australia)*
- 16:45 COFFEE AND POSTERS (P-1 to P-16)

## The 2012 Phenomenon (continued)

- 17:15 Lord of the Maya Creations on his Jaguar Throne: the eternal return of Elder Brother God L to preside over the 2012 transformation *John B. Carlson (USA)* **O-18**
- 17:45 Measuring Deep Time: the sidereal year and the tropical year in Maya Inscriptions *Michael J. Grofe (USA)* **O-19**
- 18:15 The God's Grand Costume Ball: a Classic Maya prophecy for the close of the thirteenth Bak'tun *Barbara MacLeod (USA)* **O-20**
- 18:45 Panel review and general discussion *Led by Nicholas Campion (UK)*

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## PUBLIC LECTURE by Gary Urton

### **The Role of Khipu Cord-Keeping in Inka Astronomy, Calendrics and State Administration**

This talk surveys what we have learned to date about how the Inka khipu functioned as a record-keeping device and what role cord-keeping played in the construction of Inka administrative practices relating to time, materiality, and power.

## CONFERENCIA PÚBLICA de Gary Urton

### **El Papel de los Quipu en la Astronomía Inka, los Calendarios y la Administración del Estado**

Esta conferencia resume lo que hemos aprendido hasta la fecha acerca de cómo los quipu inka funcionaban como dispositivos de registro y qué papel jugó el registro mediante dispositivos de cuerdas en la construcción de las prácticas administrativas inka vinculadas al tiempo, la materialidad y el poder

*All Oxford IX delegates are welcome to attend this lecture, which follows the welcoming reception  
in the PUCP Cultural Centre, Av. Camino Real 1075, San Isidro  
at 21:00 on Thursday, January 6*

**MAIN CONFERENCE DAY 3 (FRIDAY JANUARY 7): 09:00–10:30**

**Archaeoastronomy: Case studies from Polynesia  
and South America**

**Session chair: Juan Belmonte**

- 09:00 **Invited keynote address** The Polynesian ritual cycle of activities and their archaeological markers in Eastern Polynesia *Edmundo Edwards (Easter Island, Chile)* **O-22**
- 09:45 Watching the sky from the ushnu: the sukanka-like summit temple in Pueblo Viejo-Pucara (Lurin Valley, Peru) *Krzysztof Makowski (Peru)* **O-23**
- 10:15 General discussion
- 10:30 COFFEE

11:00 ONWARDS: PURUCHUCO EXCURSION

**MAIN CONFERENCE DAY 4 (SATURDAY JANUARY 8): 09:00–13:00**

**Archaeoastronomy: Case studies from Asia**

**Session chair: John Steele**

- 09:00 Cosmic capitals and numinous precincts in Early China *David Pankenier (USA)* **O-25**
- 09:30 Historical changes in the celebration of seasonally based holidays and festivals in Japan: a study in cultural adaptation *Steven Renshaw (Japan)* **O-26**
- 10:00 A preliminary report on archaeoastronomy and ethnoastronomy in the Ryukyu Islands *Akira Goto (Japan)* **O-27**
- 10:30 COFFEE AND POSTERS (P-25 to P-40)
- 11:00 The sun and 15 doorways of Phanom rung *S. Komonjinda, A. Mullerup, L. Chunpongtong, and R. Phiromanukul (Thailand)* **O-28**
- 11:30 “Navagraha” worship: Hindu rituals for the planetary deities in the Suryanar Temple (Tamil Nadu, India). An ethnomusicological perspective *Mario Friscia (Italy)* **O-29**
- 12:00 General discussion
- 12.30 **Additional oral paper** The nexus between sky and land in pre-hispanic American cultures: the role of geometry and numbers *Marcello Ranieri (Italy)* **P-38**

13:00 – 15:00 LUNCH

**MAIN CONFERENCE DAY 4 (SATURDAY JANUARY 8): 15:00–19:00**

**Archaeoastronomy of the Casma Valley, Peru**

*Session organized by Robert A. Benfer (University of Missouri, USA)*

- 15:00 Introduction to the session *Robert A. Benfer (USA)*
- 15:30 The social and ritual context of astronomical observations at Chankillo, Casma, Peru **O-31**  
*Ivan Ghezzi (Peru) and Clive Ruggles (UK)*
- 16:00 Chankillo: solar axis, lunar ritual, and shamanic transformation *J. McKim Malville (USA)* **O-32**
- 16:30 COFFEE AND POSTERS (P-25 to P-40)
- 17:00 Early quartz mines and other effigy mounds in the valleys of Casma and Chillón, Peru **O-33**  
*Robert A. Benfer and Larry R. Adkins (USA)*
- 17:30 Stellar alignments in the Late Preceramic in the Casma Valley of Peru *Larry R. Adkins and Robert A. Benfer (USA)* **O-34**
- 18:00 Solstice alignments in different occupation phases at Sechín Bajo *Peter Fuchs and Bernard Lorenz (USA)* **O-35**
- 18:30 Panel review and general discussion *Led by Krzysztof Makowski (Peru)*

**MAIN CONFERENCE DAY 5 (SUNDAY JANUARY 9): 09:00–13:00**

**Archaeoastronomy: Case studies from the Arabic World  
and Europe**

**Session chair: Clive Ruggles**

- 09:00 **Invited keynote address** Astronomy and culture in Late Babylonian Uruk *John Steele (USA)* **O-36**
- 09:45 Predicting the crescent visibility with a modified astrolabe in Arabic Astronomy of X-XI centuries AD *Flora Vafea (Egypt)* **O-37**
- 10:15 Ritual and the cosmos: astronomy and myth in the Athenian Acropolis *Efrosyni Boutsikas (UK) and Robert Hannah (New Zealand)* **O-38**
- 10:45 COFFEE AND POSTERS (P-25 to P-40)
- 11:15 Archaeoastronomical research at the University of Wales, Trinity Saint David *Nicholas Campion (UK) and J. McKim Malville (USA)* **O-39**
- 11:45 Diachronic study of orientations: Merida A case study *César González-García and Lourdes Costa-Ferrer (Spain)* **O-40**
- 12:15 Revealing regional cultural connections within Scotland *Gail Higginbottom and Andrew Smith (Australia)* **O-41**
- 12:45 General discussion

13:00 – 15:00 LUNCH

**MAIN CONFERENCE DAY 5 (SUNDAY JANUARY 9): 15:00–16:15**

**Archaeoastronomy: Case studies from North America**

**Session chair: Stephen McCluskey**

- 15:00 Ancestors and the sun: astronomy, architecture and culture at Chaco Canyon *Andrew Munro (Australia) and J. McKim Malville (USA)* **O-42**
- 15:30 Legacy documentation: using historical resources in your cultural astronomy project *Gregory Munson (Colorado, USA)* **O-43**
- 16:00 General discussion
- 16:15 COFFEE AND POSTERS (P-25 to P-40)

**MAIN CONFERENCE DAY 5 (SUNDAY JANUARY 9): 16:45–19:00**

**Closing Session**

- 16:45 Commentary and discussion *Presented and led by Johanna Broda (Mexico)*
- 17:15 Portal to the Heritage of Astronomy *Ruediger Schultz (Austria)* **O-44**
- 17:45 ISAAC GENERAL MEETING

**REGIONAL MEETING DAY 1 (WEDNESDAY JANUARY 12): 09:00–10:30**

**Introductory workshop I: Principles of cultural astronomy**

**Led by Clive Ruggles and Stanislaw Iwaniszewski**

10:30 – 11:00 COFFEE AND POSTERS (P-1 to P-24)

**REGIONAL MEETING DAY 1 (WEDNESDAY JANUARY 12): 11:00–17:30**

**Ethnoastronomy**

**Session chair: Priscila Faulhaber**

- 11:00 **Invited keynote address** La etnoastronomía como campo académico: esbozo de un programa sudamericano *Alejandro López (Argentina)* **O-45**
- 11:45 Peligro, poder y liminaridad: la luna y las mujeres *Cecilia Paula Gómez (Argentina)* **O-46**
- 12:15 Reflexões sobre etnoastronomia Guarani *Flávia Cristina Mello, Jules Soares and Leandro Kerber (Brasil)* **O-47**
- 12:45 Discussion

13:00 – 15:00 LUNCH

**REGIONAL MEETING DAY 1 (WEDNESDAY JANUARY 12): 11:00–17:30 (continued)**

- 15:00 Un eucalipto en la luna: folklore astronomico de los colonos europeos del norte de la provincia argentina de Santa Fe *Armando Mudrik (Argentina)* **O-48**
- 15:30 La concepción Tomaraho de lo celeste *Alejandro Gangui (Argentina)* **O-49**
- 16:00 COFFEE AND POSTERS (P-1 to P-24)
- 16:30 Discussion forum *Led by Alejandro López (Argentina)*

17:30 – 18:30 SIAC GENERAL MEETING

**REGIONAL MEETING DAY 2 (THURSDAY JANUARY 13): 09:00–10:30**

**Introductory workshop II: Field and laboratory techniques**

*Led by Kim Malville and others*

10:30 – 11:00 COFFEE AND POSTERS (P-1 to P-24)

**REGIONAL MEETING DAY 2 (THURSDAY JANUARY 13): 11:00–16:30**

**Archaeoastronomy**

**Session chair: Ricardo Moyano**

- 11:00 **Invited keynote address** Ofrendas y el orden del espacio-tiempo en Mesoamerica: las matemáticas indígenas y la arqueoastronomía en una perspectiva comparativa *Johanna Broda (México)* **O-52**
- 11:45 Observaciones arqueo-astronómicas en el cerro del Tepeyac: la fecha de aparición de la Virgen de Guadalupe asociado a un marcador pre-solsticial en el norte de la Cuenca de México *Rafael Zimbron y Ricardo Moyano (México)* **O-53**
- 12:15 Alineamientos astronómicos del “Geoglifo de Shiqui – Jardín Jardín” sobre la meseta de Huánuco Pampa, en los Andes Centrales del Perú *Jose Luis Pino Matos, Hernán Ramos Doria y Gerardo Quiroga Diaz (Perú)* **O-55**
- 12:45 Discussion

13:00 – 15:00 LUNCH

- 15:00 La Horca del Inca: ¿Observatorio Astronómico? *Gonzalo Pereira Quiroga (Bolivia)* **O-56**
- 15:30 Astronomía cultural en las laderas del volcán Galeras: Andes del sur de Colombia *Armando José Quijano Vodniza (Colombia)* **O-57**
- 16:00 Discussion

16:30 – 17:00 COFFEE AND POSTERS (P-1 to P-24)

**REGIONAL MEETING DAY 2 (THURSDAY JANUARY 13): 17:00–18:30**

**Archaeoastronomy and education**

***Session chair: Ivan Ghezzi***

- 17:00 Partiendo desde casa: educación patrimonial para la socialización del conocimiento. **O-58**  
Arqueoastronomía de Malargüe, Mendoza, Argentina *Hugo Alejandro Tucker, Roberto Bandiera, Andrés Risi, Jessica Vazquez y Karina Diaz (Argentina)*
- 17:30 El patrimonio arqueoastronómico del Valle de Yocavil y Nevados del Aconquija en la **O-59**  
enseñanza de la astronomía *Lía Celinda Acosta y Leonor Colombo de Cudmani (Argentina)*
- 18:00 Discussion

**REGIONAL MEETING DAY 2 (THURSDAY JANUARY 13): 09:00–10:30**

**Introductory workshop III: South American cultural astronomy**

***Led by Stanislaw Iwaniszewski***

10:30 – 11:00 COFFEE AND POSTERS (P-1 to P-24)

**REGIONAL MEETING DAY 3 (THURSDAY JANUARY 13): 11:00–13:00**

**Archaeoastronomy (continued)**

***Session chair: Ivan Ghezzi***

- 11:00 Calendar and agricultural regulation: solstice events in Moray, Cusco *John Earls (Peru)* **O-61**
- 11:45 Arqueoastronomía en el Apunao, 4753 msm, Argentina *Cristian Eduardo Jacob (Argentina)* **O-63**
- 12:15 Discussion forum *Led by José Pino Matos (Perú)*

**REGIONAL MEETING DAY 2 (THURSDAY JANUARY 13): 15:00–18:30**

**Workshop: Cultural astronomy, film, and reporters**

***Organised by Jarita Holbrook and Thebe Medupe***

***Led by Holly Wissler***

## Poster papers

<b>P-1</b>	Ethnoastronomy and education in the Colombian Amazon <i>Sarita Kendall, Rocio Perdomo, Marekvi Laureano and Casimiro Ahue (Colombia)</i>
<b>P-3</b>	Teaching archaeoastronomy and ethnoastronomy for Brazilian students from basic school <i>Victor Alves Alencar (Brasil)</i>
<b>P-4</b>	Resgatando o céu através do diálogo entre a cultura científica e humanística <i>Jules Soares, Leandro Kerber, Flávia de Mello e Romualdo Lisboa (Brasil)</i>
<b>P-5</b>	Una propuesta para la enseñanza de la astronomía: el recurso de la arqueoastronomía <i>Lía Celinda Acosta, Gustavo Diaz Martin y Olga Pintado (Argentina)</i>
<b>P-6</b>	Visions of the Pindorama sky <i>Rundsthen de Nader, Cintia Jales and Maura Imazio da Silveira (Brasil)</i>
<b>P-7</b>	Astronomy, water sources, and religion <i>David Johnson (USA)</i>
<b>P-8</b>	Astronomical identity of the Inca god-creator <i>Rita Fink (USA)</i>
<b>P-9</b>	Choquequirao, Topa Inca's Machu Picchu: comparing two royal estates of the Inca <i>Kim Malville and Gary Ziegler (USA)</i>
<b>P-10</b>	Límites geográficos y astronómicos del Tahuantinsuyo <i>Barthélémy d'Ans y Manuel Aguirre-Morales (Perú)</i>
<b>P-11</b>	Con el sol, la luna y las estrellas: arqueoastronomía en Pachacamac <i>Alfio Pinasco (Perú)</i>
<b>P-12</b>	Cuentas calendáricas en el Tawantinsuyo: una visión desde la Provincia Inca costeña de Pachacámac <i>Juan Pablo Villanueva (Perú)</i>
<b>P-13</b>	Observación de los lunasticos en las culturas precolombinas <i>Jorge Ianiszewski Rojas (Chile)</i>
<b>P-15</b>	Peña Horadada de Lima: descubriendo su valor arqueoastronómico <i>Carlota Pereyra Rey (Perú)</i>
<b>P-16</b>	Machu Picchu: geometries, numbers and length-unit <i>Marcello Ranieri (Italy) and Milton Rojas Gamarra (Chile)</i>
<b>P-17</b>	Cosmogonia indígena no Brasil e suas semelhanças nas Américas do Sul e Central <i>Peter Leroy (Brasil)</i>
<b>P-18</b>	Native Brazilian astronomy <i>Ronaldo Mourão (Brasil)</i>
<b>P-19</b>	El cerebro humano y la construcción del entorno: cielo y tierra como instrumento astronómico escala 1:1 <i>Patricio Bustamante Díaz (EE.UU.) y Ricardo Moyano Vasconcellos (México)</i>
<b>P-20</b>	The astronomy behind the IntipRaymi ceremony <i>Milton Rojas Gamarra and Gabriela Rojas Gamarra (Chile)</i>
<b>P-21</b>	Identificación de objetos astronómicos en grabados rupestres: aportes metodológicos en arqueoastronomía <i>Hugo Tucker, Roberto Bandiera y Andrés Risi (Argentina)</i>
<b>P-22</b>	El cielo en las rocas: Arqueoastronomía del sur de Mendoza (Argentina) <i>Hugo Tucker, Roberto Bandiera, Andrés Risi y Jorge Luna (Argentina)</i>
<b>P-23</b>	Astronomía quechua y orden celeste <i>Barthelemy d'Ans (Perú)</i>



<b>P-26</b>	Ancient Skies: human cultures and their skies <i>Doris Vickers and Rüdiger Schultz (Austria)</i>
<b>P-28</b>	Arab celestial complexes from the Pleiades to Canopus <i>Ben Adams (USA)</i>
<b>P-29</b>	Traditional rites and their celestial alignments in parts of south-eastern Nigeria <i>J.O. Urama, P. Eze-Uzomaka, F. Chami, J.K. Obatala and C. Opata (Nigeria)</i>
<b>P-31</b>	Astronomía, cultura y paisaje en la Edad del Hierro en la Cuenca del Ebro <i>Manuel Pérez Gutiérrez, David Bea Castaño, Jordi Diloli Fons y Samuel Sardà Seuma (España)</i>
<b>P-33</b>	The astronomy of Kreisgrabenanlagen (neolithic circular ditch systems): an interdisciplinary approach <i>Georg Zotti and Wolfgang Neubauer (Austria)</i>
<b>P-36</b>	Did Maya commoners build astronomically oriented architectural assemblages? Ritual site design in the suburban community of Chawak <i>Chance Coughenour (Spain)</i>
<b>P-37</b>	Calendarios y Yanantín: simetrías de rotación y reflexión y diagramas espacio-temporales en América <i>Paola González Carvajal y Javier Tamblay Sepúlveda (Chile)</i>
<b>P-39</b>	The astronomy of Aboriginal Australians: more than ceremony <i>Ray Norris and Duane Hamacher (Australia)</i>

## IAU S278

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UK	<b>2</b>	<b>1.7%</b>
USA	<b>26</b>	<b>21.7%</b>

# IAU S278

## BRIEF REPORT

### Overview

IAU Symposium S278, entitled “Archeoastronomy and Ethnoastronomy: Building Bridges between Cultures”, took place in Lima, Peru, on January 5–14, 2011. This was also an “Oxford” Symposium on Archeoastronomy, the ninth in what is certainly the foremost series of international conferences on the topic. Meetings in the series have been held at roughly four-yearly intervals since 1981, when Michael Hoskin, the then-Commission 41 President, organised the first.

One of the most important aspects of the conference was the strong link with the IAU’s new decadal strategic plan, “Astronomy for the Developing World”. In his opening address IAU Vice-President George Miley<sup>1</sup> described the strategic plan as an ambitious blueprint to mobilize talented astronomers, engineers and teachers around the world in the service of developing countries. The “building bridges” of the title refers to the connections between cultural astronomy and the advancement of modern astronomy in the developing world, and the conference succeeded in sparking off several initiatives to identify and develop these connections in the coming months and years. As George pointed out: “Astronomy is a unique tool for development because it combines cutting-edge technology with fundamental science and also has deep cultural roots.” It is the business of archaeoastronomy to explore these roots.

This was the first ever IAU Symposium explicitly concerning this highly interdisciplinary topic, one of interest not only to astronomers but also to archaeologists, historians, anthropologists, architects, art historians, historians of religions and others. This was also the first “Oxford” conference to be held in South America, thus providing a unique opportunity to strengthen the community of scholars practicing ethno- and archaeoastronomy in South America and to forge stronger links between them and the global community of researchers. In order to balance global participation and regional engagement, one and a half days of the four-and-a-half-day main conference (Jan 5–9) were devoted to South American topics, while the three-day Regional Meeting (Jan 12–14) was devoted exclusively to Latin America.

The two parts of the conference attracted a total of 120 participants including 9 young Peruvian scholars and students awarded scholarships by one of the local organisers, the Anglo-Peruvian Cultural Association (ACPB). The conference attracted considerable media attention in local and national newspapers and magazines.

### Scientific highlights of the meeting

One of the key characteristics of the “Oxford” conferences is the avoidance of parallel sessions, giving everyone the opportunity to hear talks by the full range of specialists, and to come into direct contact with disciplinary approaches very different from their own. The “Oxford” conferences provide a leading forum of interchange between diverse disciplines, and seven invited keynote lectures set the stage for this in Lima:

- Stephen McCluskey (USA): The two cultures of archaeoastronomy and the history of science

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<sup>1</sup> Sadly, George himself had to withdraw from the conference for health reasons, and his words were conveyed by Clive Ruggles.

- Gary Urton (USA): What can the study of astronomy contribute to anthropology? An Andean perspective
- Alejandro López (Argentina): Ethnoastronomy as an academic field: the outline of a South American programme
- Johanna Broda (Mexico): Offerings and spatio-temporal order in Mesoamerica: indigenous mathematics and archaeoastronomy in comparative perspective
- Edmundo Edwards (Easter Island): The Polynesian ritual cycle of activities and their archaeological markers in Eastern Polynesia
- Ricardo Moyano (Chile): Sub-tropical astronomy in the southern Andes
- John Steele (USA): Astronomy and culture in Late Babylonian Uruk

(Unfortunately, visa problems prevented Professor Sun Xiaochun from attending the conference and presenting his keynote speech on Archaeoastronomy in China.)

Clive Ruggles's opening keynote, "Pushing back the frontiers or still running around the same circles? 'Interpretative archaeoastronomy' thirty years on" ensured that cutting-edge issues of field methodology and social theory were to the fore. Archaeoastronomy is a science that addresses social questions, and it is essential not only to do meticulous science in the field but also to produce anthropologically viable interpretations.

The many highlights among the contributed papers included several on aspects of indigenous astronomical practices in Argentina, Brazil, and other South American countries; David Pankenier's study of the cosmological design of ritual precincts in Imperial China; Efrosyni Boutsikas and Robert Hannah's integration of evidence from archaeoastronomy and historical literature to reconstruct aspects of ancient Greek cult practices and their relationship to particular constellations; and Flora Vafea's reconstruction, from historical accounts, of the use of a modified astrolabe to predict the visibility of the lunar crescent by tenth- and eleventh-century Muslim astronomers.

A thematic half-day session on "The 2012 phenomenon: Maya calendar, astronomy, and apocalypticism in the worlds of scholarship and global popular culture", organized by John Carlson and Mark van Stone, linked together studies of Mayan literature and of modern "alternative" beliefs. Another on "The archaeoastronomy of the Casma Valley, Peru", organized by Robert Benfer, provided some detailed debate about the interpretation of the now-famous thirteen towers of Chankillo, a solar observation site dating to c. 300 BC, and of related sites nearby, which was followed up by a two-day visit to the area.

A particular highlight of the conference was a public lecture by Gary Urton, Professor of Anthropology at Harvard University, entitled "The Role of Khipu Cord-Keeping in Inka Astronomy: Calendrics and State Administration", describing how the Inka khipus (knotted-cord strings) functioned as a record-keeping device important in the maintenance of Inka administrative practices relating to time, materiality, and power. Professor Urton also provided an expert commentary on the khipus held in the museum at the Inca site of Puruchuco, visited on a half-day mid-conference excursion.

## **IAU Symposium 279**

[Death of Massive Stars: Supernovae and Gamma-Ray Bursts](#)

Nikko, Japan (Mar.12-16, 2012)

Postponed from 2011 because of the 3/11 disaster in Japan.





## POST MEETING REPORT FORM

for meetings other than Joint Discussions and Special Sessions

Deadline for Submission: within 1 month after the meeting

**the following information should be sent  
to the IAU Assistant General Secretary**

The following documents should be attached:

- i Final Scientific Program
- ii List of participants
- iii List of recipients of IAU Grants, including amount and country
- iv Receipts signed by the recipients of IAU Grants (This does not apply to Scientific Meetings held during General Assemblies)
- v Brief report (text.txt file or word.doc) to the Executive Committee on the scientific highlights of the meeting (1-2 pages)

1. Meeting Number:

IAU Symposium 280

2. Meeting Title:

The Molecular Universe

3. Coordinating Division:

Division VI on Interstellar Matter

4. Dedication of meeting (if any):

5. Location (city, country):

Toledo, Spain

6. Dates of meeting:

May 30 - June 3, 2011

7. Number of participants:

435

8. List of represented countries:

See List of Participants in this report

9. Report submitted by:

Prof. Eric Herbst

10. Date and place:

Madrid, June 20, 2011

11. Signature of SOC Chairperson:

# IAU Symposium 280 "The Molecular Universe"

(May 30 - June 3, 2011, Toledo, Spain)

## FINAL PROGRAM

### Sunday May 29

**18:00h - 21:00** Registration & Welcome reception at the Sabatini Building

### Monday May 30

<b>08:15</b>	<b>Registration</b>	
	<b>Put up posters session 1</b>	
<b>08:40 - 09:00</b>	E.F. van Dishoeck	<b>Opening and welcome</b>
	J. Cernicharo	<b>Logistical matters</b>
<b>09:00 - 09:30</b>	A.G.G.M. Tielens	<b>The molecular universe: overview</b>
<b>Star Formation I (Chairs: E.F. van Dishoeck (09:30-10:45); S.-Y. Liu (11:15-11:55))</b>		
<b>09:30 - 09:55</b>	P. Caselli	<b>Observational studies of pre-stellar cores and IRDCs (I)</b>
<b>09:55 - 10:20</b>	J. Jorgensen	<b>Interferometric studies of low-mass protostars (I)</b>
<b>10:20 - 10:45</b>	Y. Aikawa	<b>Hydrodynamical-chemical models from prestellar cores to protostellar cores (I)</b>
<b>10:45 - 11:15</b>	Coffee/tea	
<b>11:15 - 11:30</b>	J.-E. Lee	<b>The D/H ratio of water ice in star formation ©</b>
<b>11:30 - 11:55</b>	R. Bachiller	<b>Molecules in outflows (I)</b>
<b>Herschel hot results 1 (Chair: G. Pilbratt)</b>		
<b>11:55 - 12:05</b>	G. Pilbratt	<b>Herschel introduction</b>
<b>12:05 - 12:20</b>	B. Lefloch	<b>Molecules in protostellar shocks: the CHESS view on L1157-B1 ©</b>
<b>12:20 - 12:35</b>	N. Crockett	<b>HEXOS: analysis of the HIFI 1.2 THz wide spectral survey toward Orion KL ©</b>
<b>12:35 - 12:50</b>	L. Kristensen	<b>WISHes coming true: low-mass protostars as chemical fountains ©</b>
<b>12:50 - 13:05</b>	A. Fuente	<b>The chemistry of water in the UC HII region MonR2 ©</b>
<b>13:05 - 15:00</b>	Lunch + AI Fresco discussions	
<b>Solar System Objects (Chairs: S. Charnley (15:00-16:50); G. Muñoz-Caro (16:50-17:40))</b>		
<b>15:00 - 15:40</b>	J. Lunine	<b>Chemistry of the Solar System (R)</b>
<b>15:40 - 15:55</b>	D.E. Jennings	<b>The Atmospheres of Titan and Saturn in the IR from Cassini: The Interplay Between Observation and Lab Studies ©</b>
<b>15:55 - 16:20</b>	D. Bockelee-Morvan	<b>Recent results on the composition of comets (I)</b>
<b>16:20 - 16:35</b>	D. Lis	<b>Herschel observations of comet Hartley 2: D/H in a Jupiter family comet ©</b>
<b>16:35 - 16:50</b>	M. Hogerheijde	<b>Detecting the cold water reservoir in a protoplanetary disk ©</b>
<b>16:50 - 17:15</b>	S. Sandford	<b>The Power of Sample Return Missions - Stardust and Hayabusa (I)</b>
<b>17:15 - 17:40</b>	C. Alexander	<b>Organics in Meteorites - solar or interstellar? (I)</b>
<b>17:40 - 20:00</b>	<b>Poster session I con tapas (Poster presenters at their poster)</b>	
<b>20:15-</b>	<b>Buses back to hotels</b>	

## Tuesday May 31

### Evolved Stars (Chair: D. Field)

08:45 - 09:10	S. Kwok	<b>Molecular evolution from AGB stars to planetary nebulae (I)</b>
09:10 - 09:35	J. Cernicharo	<b>Line surveys of evolved stars (I)</b>
09:35 - 09:50	M. Guelin	<b>Time dependent anion chemistry in the CSE IRC+10216 ©</b>
09:50 - 10:15	I. Cherchneff	<b>Molecules in supernova ejecta (I)</b>
10:15 - 10:35	J. Cami	<b>Fullerenes in circumstellar and interstellar environments (I)</b>
10:35 - 10:50	C. Contreras	<b>Formation and destruction processes of carbonaceous interstellar dust ©</b>
10:50 - 11:15		Coffee/tea

### Star Formation and Complex Molecules (Chair: E. Herbst)

11:15 - 11:40	N. Sakai	<b>Observations of Complex Molecules in Low-Mass Protostars (I)</b>
11:40 - 12:05	K. Oberg	<b>Ices in starless and star-forming cores (I)</b>
12:05 - 12:30	J. Martin-Pintado	<b>GC clouds and complex molecules (I)</b>
12:30 - 12:55	S. Widicus	<b>Models of hot cores with complex molecules (I)</b>
12:55 - 13:10	A.I. Vasyunin	<b>New chemical models for new era observations: a multiphase Monte Carlo model of gas-grain chemistry ©</b>
13:15 - 15:15		Lunch + AI Fresco discussions

**Take down posters session 1 - Put up posters session 2**

### Basic molecular processes I (Chair: I. Sims)

15:15 - 15:55	I. Smith	<b>Gas-Phase Processes: rate coefficients, temperature dependences, and reaction products (R)</b>
15:55 - 16:20	S. Klippenstein	<b>Theory of Low Temperature Reactions (I)</b>
16:20 - 16:45	V. Bierbaum	<b>Anions in space and in the laboratory (I)</b>
16:45 - 17:15		Coffee/tea

### Herschel hot results 2 (Chair: J.R. Pardo)

17:15 - 17:30	P. Goldsmith	<b>Herschel oxygen project observations of O<sub>2</sub> in Orion ©</b>
17:30 - 17:45	L. Decin	<b>Chemical enrichment of the ISM through the mass loss of evolved stars ©</b>
17:45 - 18:00	W.F. Thi	<b>Modeling the gas and dust of protoplanetary disks in the Herschel-GASPS sample ©</b>
18:00 - 18:15	S.C. Madden	<b>Where is the molecular gas in low metallicity dwarf galaxies? ©</b>
18:15 - 18:30	K.M. Menten	<b>An interferometric 270-355 GHz spectral line survey of the red supergiant VY CMa ©</b>
18:30 - 19:00		AI Fresco discussions
19:00-		Buses back to hotels

## Wednesday June 1

### Protoplanetary disks (Chair: I. Kamp)

08:45 - 09:10	A. Dutrey	Millimeter/submm observations of molecules in disks (I)
09:10 - 09:25	E. Bergin	DISCS: a disk imaging survey of chemistry with the SMA ©
09:25 - 09:50	D. Semenov	Chemical models of protoplanetary disks (I)
09:50 - 10:15	C. Salyk	IR observational studies of gas in disks (I)
10:15 - 10:30	K. France	The Far-UV molecular spectrum of protoplanetary disks: new views from Hubble ©
10:30 - 10:55	R. Visser	Chemical history of molecules in disks (I)
10:55 - 11:25	Coffee/tea	

### Basic molecular processes II (Chair: L. Hornekaer)

11:25 - 12:05	H. Linnartz	Unlocking the (solid state) chemistry of the heavens (R)
12:05 - 12:30	F. Dulieu	Water ice formation and the o/p ratio (I)
12:30 - 12:55	C. Jaeger	Solid-state spectroscopy (I)
12:55 - 13:10	J.L. Lemaire	Competing mechanisms in the formation of H <sub>2</sub> on silicates in conditions pertinent to the ISM ©
13:15 - 14:45	Lunch	
14:45 - 17:15	Poster session 2 con café (Poster presenters at their poster)	
18:00 -	Buses back to hotels	
20:00 -	Classical Concert at Hotel Beatriz Auditorium	
21:15 -	Conference dinner at Hotel Beatriz	

## Thursday June 2

### Extragalactic chemistry (Chair: S. García-Burillo)

#### Take down posters session 2 - Put up posters session 3

08:50 - 09:15	S. Glover	The Chemistry of the Early Universe (I)
09:15 - 09:30	A. Sternberg	Molecular clouds at the reionization epoch ©
09:30 - 09:55	S. Muller	Absorption line surveys at intermediate redshift (I)
09:55 - 10:20	S. Martin	Extragalactic line surveys (I)
10:20 - 10:45	K. Kraiberg-Knudsen	Observations of molecules at high redshift (I)
10:45 - 11:10	F. van der Tak	Molecular data and radiative transfer (I)
11:10 - 11:40	Coffee/tea	

### Exoplanets and their atmospheres (Chair: G. Blake)

11:40 - 12:05	G. Tinetti	Exoplanetary atmosphere observations (I)
12:05 - 12:30	E. Hebrard	Exoplanetary atmosphere models (I)
12:30 - 12:45	C. Walsh	The chemistry of exoplanet atmospheres ©
12:45 - 13:10	L. Kaltenegger	Biomarkers of habitable worlds - Super-Earths and Earths (I)
13:10 - 15:00	Lunch + AI Fresco discussions	

### Tools of analysis and databases (Chair: J. Pearson)

15:00 - 15:05	E. Herbst	In memoriam G. Winnewisser
15:05 - 15:30	F. de Lucia	How Can We Use Complete Experimental Catalogs in the Complex Spectra Limit? (I)
15:30 - 15:55	P. Schilke	Tools for analysis of spectral surveys (I)
15:55 - 16:10	S. Takano	Nobeyama 45m telescope legacy project: Line survey ©
16:10 - 16:25	T.J. Millar	Overview of data bases
16:25 - 17:30	Panel 'On to ALMA' Chair: S. Yamamoto; Panel members: G. Blake, G. Garay, M. Guelin, K. Menten	
17:30 - 20:00	Poster session 3 con tapas (Poster presenters at their poster) Database demonstrations	
20:15 -	Buses back to hotels	

## Friday June 3

Diffuse clouds and PDRs (Chairs: E. Roueff (08:45-10:45); P. de Vicente (11:10-11:50))

- 08:45 - 09:10 E. Peeters      **The PAH hypothesis after 25 years (I)**  
09:10 - 09:25 J. Thrower      **Laboratory investigations of the formation of  
superhydrogenated PAHs ©**  
09:25 - 09:50 N. Cox      **The diffuse interstellar bands and their carriers:  
The mystery unfolds? (I)**  
09:50 - 10:05 R. Raghunandan      **H<sub>2</sub>C<sub>3</sub> - a diffuse interstellar band carrier ©**  
10:05 - 10:20 G. Rouille      **Spectroscopy of PAHs with carbon side chains ©**  
10:20 - 10:45 R. Meijerink      **PDRs and XDRs (I)**  
10:45 - 11:10      **Coffee/tea + light snacks**  
11:10 - 11:35 E. Falgarone      **Turbulence in diffuse clouds (I)**  
11:35 - 11:50 T.R. Geballe      **Exploring the central molecular zone with H<sub>3</sub><sup>+</sup> and CO ©**

Herschel hot results 3 (Chair: D. Johnstone)

- 11:50 - 12:05 J.R. Goicoechea      **First detection of far-IR OH emission towards  
the Orion Bar PDR ©**  
12:05 - 12:25 T.G. Phillips      **The ubiquitous nature of HF ©**  
12:25 - 12:40 D. Neufeld      **Probing the diffuse ISM with hydroxyl cations  
and water cations ©**  
12:40 - 12:55 W.D. Langer      **Carbon chemistry in transitional clouds from the GOT C<sup>+</sup>  
Survey of CII 158 micron Emission in the Galactic Plane ©**  
12:55 - 13:10 B. Mookerjea      **Herschel observations of C<sub>3</sub> in star-forming regions ©**

## SUMMARY AND CLOSING

- 13:10 - 13:40 John Black      **Conference summary**  
13:40 - 13:50      **Conference closing**  
13:50 - 15:15      **Light lunch and Take down Posters session 3**

14:30 - 16:00      **Buses to Madrid Airport**

### Notes:

(R) = Review Talk (30 + 10 min)  
(I) = Invited Talk (20 + 5 min)  
© = Contributed Talk (12 + 3 min)

LOC assistance with presentations: P.  
de Vicente, T. Bell and B. Godard

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Howard Smith	Harvard-Smithsonian Center for Astrophysics	U.S.A.
Ian Smith	University of Cambridge	U.K.
Rachel Smith	University of California, Los Angeles	U.S.A.
Theodore Snow	University of Colorado	U.S.A.
Amiel Sternberg	Tel Aviv University	Israel
Yu-Nung Su	Academia Sinica, Institute of Astronomy and Astrophysics	Taiwan
Ewelina Szymanska	The Open University	U.K.
Marian Szymczak	Torun Centre for Astronomy, Nicolaus Copernicus University	Poland
Mario Tafalla	Observatorio Astronómico Nacional	Spain
Shuro Takano	Nobeyama Radio Observatory, National Astronomical Observatory	Japan
Dahbia Talbi	LUPM CNRS/Université de Montpellier II	France
Jonathan Tan	University of Florida	U.S.A.
Vianney Taquet	Institut de Planétologie et d'Astrophysique de Grenoble	France
Konstantinos Tassis	Jet Propulsion Laboratory / Caltech	U.S.A.
Belén Tercero	CAB. INTA-CSIC	Spain
David Teyssier	ESAC	Spain
Patrice Theule	University of Provence	France
Wing-Fai Thi	Institut de Planétologie et d'Astrophysique de Grenoble	France
Sven Thorwirth	I. Physikalisches Institut Universität zu Köln	Germany
John Throer	Aarhus University	Denmark
Alexander Tielens	Leiden Observatory	Netherlands
Giovanna Tinetti	University College London. Dept. of Physics and Astronomy	U.K.
Samuel Tisi	Department of Physics and Astronomy, University of Waterloo	Canada

## Hoja1

Thomas Townsend	Universidad de Castilla- La Mancha	Spain
Josep Trigo Rodríguez	Institute of Space Sciences (CSIC-IEEC)	Spain
Matthew Troutman	University of Missouri - St. Louis	U.S.A.
Antonio Usero	Observatorio Astronómico Nacional	Spain
Nathalie Vaeck	Université Libre de Bruxelles	Belgium
Nienke van der Marel	Leiden Observatory	Netherlands
Floris van der Tak	SRON	Netherlands
Ewine van Dishoeck	Leiden Observatory/PE	Netherlands
Peter van Hoof	Royal Observatory of Belgium	Belgium
Huib Jan van Langevelde	Joint Institute for VLBI in Europe and Sterrewacht Leiden,	Netherlands
Magda Vasta	INAF OA Arcetri - Florence	Italy
Charlotte Vastel	IRAP/Université de Toulouse	France
Anton Vasyunin	The Ohio State University	U.S.A.
Tatiana Vasyunina	The Ohio State University	U.S.A.
Luis Velilla Prieto	CAB (Astrobiology Center). INTA-CSIC.	Spain
Thangasamy Velusamy	Jet Propulsion Laboratory (Caltech)	U.S.A.
Gianfranco Vidali	Syracuse University	U.S.A.
Ruud Visser	University of Michigan	U.S.A.
Serena Viti	Department of Physics and Astronomy, University College Lond	U.K.
Stéphane Vranckx	Free University of Brussels (ULB)	Belgium
Valentine Wakelam	Laboratoire d'Astrophysique de Bordeaux / Université de Bord	France
Malcolm Walmsley	INAF-Osservatorio di Arcetri	Italy
Catherine Walsh	Queen's University Belfast	U.K.
Adam Walters	IRAP	France
Susanne Wampfler	Institute for Astronomy, ETH Zurich	Switzerland
Kuo-Song Wang	Leiden Observatory	Netherlands
Naoki Watanabe	Institute of Low Temperature Science, Hokkaido Univ.	Japan
Yoshimasa Watanabe	The University of Tokyo	Japan
Susanna Widicus Weaver	Emory University	U.S.A.
Dmitri Wiebe	Institute of Astronomy of the RAS	Russia
Eva Wirström	NASA Goddard Space Flight Center	U.S.A.
Markus Wittkowski	ESO	Germany
Mark Wolfire	University of Maryland	U.S.A.
Paul Woods	University College London	U.K.
Bohan Wu	University of Basel	Switzerland
Ronin Wu	Service d'Astrophysique CEA Saclay	France
Friedrich Wyrowski	Max Planck Institute for Radioastronomy, Bonn	Germany
Satoshi Yamamoto	Department of Physics, The University of Tokyo	Japan
Umut Yildiz	Leiden Observatory	Netherlands
Walter Yvart	LERMA	France
Laimons Zacs	University of Latvia	Latvia
Junfeng Zhen	Sackler laboratory for astrophysics, Leiden Observatory	Netherlands



Hoja1

jianjun Zhou	Urumqi Observatory, National Astronomical Observatories, CAS	China
Igor Zinchenko	Institute of Applied Physics, Russian Academy of Sciences	Russia
Emilie-Laure Zins	LADIR Université Pierre et Marie Curie	France

**INTERNATIONAL ASTRONOMICAL UNION**  
*UNION ASTRONOMIQUE INTERNATIONALE*

**IAU Symposium 280**

**Toledo, Spain 30 May – 3 June 2011**

**REPORT**

Over 400 participants from 30 countries gathered in Toledo, Spain to attend IAU Symposium 280, entitled “The Molecular Universe,” which took place from 30 May – 3 June 2011 at the Technological Campus of the University of Castilla-La Mancha in Toledo, Spain. This is the main worldwide conference in the field of astrochemistry, held every ~5 years, and covering all areas in which molecules are found, from Solar system to the highest redshift galaxies. This breadth of topics sets the IAU symposia series apart from other meetings in the field. The weather was mainly sunny but not overly hot, allowing for many informal outdoor interactions. The Local Organizing Committee, chaired by J. Cernicharo, who was assisted by R. Bachiller, organized both the scientific and structural aspects of the meeting very well, including a delightful banquet and preceding concert. Almost all possible problems were handled amicably by M. Castellanos before the meeting was held. The cultural mecca that is Toledo added a sense of awe and excitement to the symposium, and was very easy to reach by rapid train from Madrid. The large size of the meeting did not interfere with the proceedings in any way; the auditorium where the talks were held was large enough for all participants, and the audio and video systems operated quite well. A large number of questions were asked of speakers, who, given their relative youth and diversity, brought many different viewpoints to the proceedings. The three dedicated 2.5-hr. poster sessions were very well attended and enriched the experience of the participants. The sessions were enlivened by tapas and by a variety of beverages. Informal conversations, held at intermissions from the speaking program, and during the poster sessions, were many and spirited. The large number of younger scientists at the meeting was quite impressive, and confirmed that the field of astrochemistry is entering a period of rapid growth led by new and exceedingly powerful telescopes. Whether the next meeting in the series of IAU symposia on astrochemistry can be held in the same format or will require at least some multiple sessions remains to be seen and depends upon whether the growth in size from one symposium to the next continues to occur.

The scientific organization of the symposium was undertaken by a very active IAU Working Group on Astrochemistry, under the sponsorship of IAU Commission 34 (Division VI), with co-sponsorship provided by Division VI (Interstellar Matter), Division VIII (Galaxies and the Universe), Division X (Radio Astronomy) as well as Commissions 51 (Bio-astronomy), 36 (Theory of Stellar Atmospheres), and 14 (Atomic and Molecular Data). In addition to funds from the IAU, the symposium was supported by the Spanish Ministry of Science and Innovation and the University of Castilla – La Mancha as well as by the personal research funds of J. Cernicharo (Head, LOC) and funds from his institute. There have now been six IAU symposia on astrochemistry, starting with the one held in India (1985; IAU Symposium 120). Later meetings in the series were held in Brazil (1991; IAU Symposium 150), the Netherlands (1996; IAU Symposium 178); South Korea (1999; IAU Symposium 197), and California, USA (2005; IAU Symposium 231). Each symposium has been larger than its predecessor, showing that astrochemistry is becoming a larger and more diverse community.

The scientific program of the symposium was divided into three parts: invited and review talks, contributed talks, and poster presentations. The Scientific Organizing Committee, which was the Working Group on Astrochemistry, democratically elected the speakers who gave contributed talks among the many applicants. Overall, there were 41 invited and review talks, 32 contributed talks, and 323 posters. In the oral program were three sessions on new results from the Herschel Space Observatory labeled “Herschel hot results,” as well as a panel discussion entitled “On to ALMA.” The panel members adjudicated a contest in which young investigators competed to win a prize for the best and next best projects for ALMA with the constraint of at most 10 hours observing time. There were three large poster sessions, and awards were given to the best posters in each of the three from personal funds by E. van Dishoeck. During the third poster session, there were also computer demonstrations of databases. The abstracts for all contributions to the symposium can be found on the NASA Astrophysics Data System and on the conference website: [http://www.cab.inta-csic.es/molecular\\_universe/show-abstracts.php](http://www.cab.inta-csic.es/molecular_universe/show-abstracts.php), where actual poster presentations have been uploaded by many of the authors. For those of you who prefer videos, a number of interviews and highlights of the three poster sessions can be found on the IAU Symposium 280 YouTube Channel (<http://www.youtube.com/user/IAUsymposium280>). Invited and review talks will appear in the symposium volume, edited by J. Cernicharo and R. Bachiller.

After brief words of welcome by E. van Dishoeck, chair of the SOC, and J. Cernicharo, chair of the LOC, the 4.5-day oral program started with a general introduction on the molecular universe by A. Tielens, which was followed by a session on star formation. This field has become broader since the last astrochemistry symposium, and observational talks concerning stages of both low-mass and high-mass star formation were given, as was a theoretical talk on a new class of models that combine hydrodynamics with chemical simulations in the formation of protostellar cores. This session was followed by the first session of hot results from Herschel, which emphasized observations of water vapor, molecules in protostellar shocks, and a wide spectral survey toward Orion KL.

Astrochemistry certainly extends to planetary studies, including solar system objects. A session on these objects was held after lunch on the first day of the meeting, starting with a review talk on the chemistry of the solar system, including the origin of water on Earth, which was followed by talks on comets, meteorites, and the atmospheres of Titan and Saturn. The power of sample return missions to solar system bodies was emphasized.

The second day of the meeting started with a session on evolved stars, in which supernova chemistry was also discussed. Talks on the molecular evolution from AGB stars to planetary nebulae, the role of time-dependent anionic chemistry (involving negatively-charge molecules) in IRC+10216, and the detection of fullerenes in assorted environments rounded out the session. Complex molecules are well known in IRC+10216 and other selected circumstellar sources, so this session merged well with the next one on star formation and complex molecules. Here observations of complex molecules were discussed in a variety of objects, along with current gas-grain simulations as well as possible future simulations involving the use of stochastic methods to improve the surface chemistry occurring in granular icy mantles.

Astrochemistry is based on the laboratory and theoretical study of basic atomic and molecular processes, and two sessions were held on this subject. The first concerned gas-phase processes, where a review talk was given on gas-phase reactions as a function of temperature, followed by a talk concerning the theory of low-temperature reactions, and one on experimental studies on the rates of reactions involving anions and how they relate to the observations of such species in various sources. The second day of the meeting ended with another Herschel hot topic session, highlighted by the report of an unambiguous detection of molecular oxygen in the interstellar medium.

The topic of protoplanetary disks occupied the first group of speakers on Wednesday, with talks on the phenomenal developments in observations at a variety of wavelengths ranging from the

millimeter to the far-UV and an emphasis on interferometry. Modeling was also discussed, as was the chemical history of molecules from the hot core to the disk stage. Another session on basic molecular processes followed, this one emphasizing surface processes in the laboratory and in space. Much progress has been made during the last decade in this field, but there is still a great need for further laboratory studies before robust interstellar chemical simulations including surface processes can be constructed.

Although most of astrochemistry still revolves around galactic sources, the field of extragalactic astrochemistry will receive a big boost with the onset of ALMA observations. So, it was quite appropriate to have a session on extragalactic astrochemistry, which was held on Thursday morning. This field was understood to include the early universe, so talks on early chemistry were included along with a talk on extragalactic line surveys. It is impressive to see spectra of extragalactic sources with similar complexity to those found in galactic star-forming regions three decades ago! Next in line was the explosive topic of exoplanets and their atmospheres, which will occupy more and more astrochemists as more is learned about planetary atmospheres. Talks on observations, atmospheric models and their chemistry, as well as biomarkers of habitable worlds were included. The inclusion of astrobiology is a sign that this field is gaining importance and certainly overlaps with areas of astrochemistry such as the formation of complex molecules. The final session on Thursday concerned the tools of analysis and databases. Starting with a brief memorial to the late astronomer and astrochemist Gisbert Winnewisser, this session included talks on how to reduce the problem of unidentified lines in hot cores, on various tools for analysis of spectral surveys, on a legacy line survey from the Nobeyama telescope, and on databases and their uses. The session ended with the panel discussion discussed previously.

The last day of the symposium started with a session nominally on diffuse clouds and photon-dominated regions (PDRs). The role of turbulence in diffuse clouds was discussed, as was a controversial candidate for a carrier of several diffuse interstellar bands ( $\text{H}_2\text{C}_3$ ). A talk on both PDRs and XDRs (X-ray dominated regions) was given as was a more general talk on diffuse interstellar bands. A number of aspects of the PAH hypothesis were touched upon. Finally, the complex nature of the central molecular zone of our galaxy, as seen through the infra-red spectrum of  $\text{H}_3^+$ , was explored. Next came the third of the Herschel hot topic sessions, which included talks on observations of diffuse clouds in the spiral arms of the Milky Way, carbon chemistry in translucent clouds, and the detection of  $\text{C}_3$  in envelopes of star-forming regions. The detection of the reactive ions  $\text{OH}^+$  and  $\text{H}_2\text{O}^+$  in a variety of sources was an exceptionally interesting topic. The oral program was concluded with an exceedingly thoughtful summary of the field, past, present, and future, by J. Black.

*The reader of the written volume can expect to find a cornucopia of riches concerning the state of astrochemistry before the fundamental changes that will occur when observations using the ALMA interferometer add greatly to our knowledge of sources throughout the universe. By the time of the next astrochemical symposium, much progress will have been made and the field will have grown both in size and, we trust, in understanding.*

Eric Herbst

Secretary, SOC

REPORT OF ACTIVITIES  
WORKING GROUP ON ASTROCHEMISTRY  
DIVISION VI (INTERSTELLAR MATTER)  
COMMISSION 34

The current working group on astrochemistry has performed one of its last major functions in planning IAU Symposium 280, "The Molecular Universe" which was held in late May to early June in Toledo, Spain. In the near future, a new working group will be constituted with Tom Millar (Queens University Belfast, Northern Ireland, president) and Satoshi Yamamoto (University of Tokyo, Japan) Secretary. The working group has also proposed an upgrade of the group to a Commission on Astrochemistry.

Over 435 participants from 31 countries gathered in Toledo, Spain to attend IAU Symposium 280, which took place from 30 May to 3 June 2011 at the Technological Campus of the University of Castilla-La Mancha in Toledo, Spain. This symposium is the main worldwide conference in the field of astrochemistry, held every ~5 years, and covering all areas in which molecules are found, from the Solar System to the highest redshift galaxies.

The Local Organizing Committee, chaired by J. Cernicharo and R. Bachiller, organized both the scientific and structural aspects of the meeting very well. Almost all possible logistic problems were handled amicably by M. Castellanos together with the other members of the LOC. The cultural mecca that is Toledo added a sense of awe and excitement to the symposium. The large size of the meeting did not interfere with the proceedings in any way. A large number of questions were asked of speakers, who, given their relative youth and diversity, brought many different viewpoints to the discussions. The three dedicated 2.5-hr. poster sessions were very well attended and enriched the experience of the participants. Informal conversations, held at intermissions from the speaking program, and during the poster sessions, were many and spirited. The large number of younger scientists at the meeting was quite impressive, and confirmed that the field of astrochemistry is entering a period of rapid growth led by new and exceedingly powerful telescopes.

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the best and next best projects for ALMA with the constraint of at most 10 hours observing time. There were three large poster sessions, and awards were given to the best posters in each of the three from personal funds by E. van Dishoeck. During the third poster session, there were also computer demonstrations of databases.

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#### CURRENT MEMBERS OF THE WORKING GROUP ON ASTROCHEMISTRY

E. van Dishoeck (President, The Netherlands) E. Herbst (Secretary, USA) Y. Aikawa (Japan) J. Black (Sweden) G. A. Blake (USA) P. Caselli (United Kingdom) J. Cernicharo (Spain) G. Garay (Chile) M. Guelin (France) U. Jorgensen (Denmark) S. Kwok (China) J. Maier (Switzerland) K. Menten (Germany) T. Millar (United Kingdom) F. Salama (USA) I. Sims (France) A. Sternberg (Israel)

*Eric Herbst*

*Secretary, Scientific Organizing Committee*

*September 2011*



## POST MEETING REPORT FORM

for meetings other than Joint Discussions and Special Sessions

Deadline for Submission: within 1 month after the meeting

**the following information should be sent  
to the IAU Assistant General Secretary**

The following documents should be attached:

- i Final Scientific Program
- ii List of participants
- iii List of recipients of IAU Grants, including amount and country
- iv Receipts signed by the recipients of IAU Grants (This does not apply to Scientific Meetings held during General Assemblies)
- v Brief report (text.txt file or word.doc) to the Executive Committee on the scientific highlights of the meeting (1-2 pages)

1. Meeting Number 281
2. "Binary Paths to Type Ia Supernovae Explosions"
3. Coordinating Divisions V (Variable Stars).
4. No dedication.
5. Location: Padova, Italy.
6. Dates of meeting: July 4-8 2011.
7. Number of participants: 131 (excluding some of local 1-day only participants).
8. List of represented countries: 30 countries, and institutions from 26 of these countries. The countries are:  
Australia, South Africa, Mozambique\*, Zimbabwe\*, Canada, USA, Mexico, Columbia\*, Chile, India, Japan, Armenia, Iran, Israel, Malaysia, Italy, France, Spain, The Netherlands, Greece, Turkey, Estonia\*, Switzerland, Poland, Russia, Germany, Belgium, United Kingdom.  
(\*=Nationals of these countries were represented, but not institutions)
8. Report submitted by: Marina Orio
9. Madison, January 12, 2012.
11. Signature of SOC Chairperson:



**IAU SYMPOSIUM 281**

**"BINARY PATHS TO TYPE IA SUPERNOVAE EXPLOSIONS"**

**PADOVA, ITALY, JULY 4-8 281**

*Only the name of the presenter is given here - Please check Abstract Booklet for a full list of authors.*

**SUNDAY JULY 3**

*18.30 Wine and Cheese reception and Castle visit at INAF-Padova*

**REGISTRATION TABLE OPEN AT INAF**

**MONDAY JULY 4**

**REGISTRATION TABLE OPEN AFTER 8.15 am**

**9-9.55 INTRODUCTION**

9-9.15 Marina Orio - INAF-PD Director - Padova mayor - 5 min each  
"Welcome addresses"

9.15-9.55 M. Kasliwal (invited)  
"Transients in the local Universe: bridging the gap between Novae and Supernovae"

**9.55-14.40 Session 1 - SUPERNOVAE: UNDERSTANDING LIGHT CURVES AND SPECTRA**

9.55-10.35 R. Kirshner (invited)  
"Using infrared observations to understand SN Ia"

10.35-11.05 Coffee Break

11.05-11.45 S. Benetti (invited)  
"20 years of SNIa spectral diversity: what have we learnt?"

11.45-12.05 S. Rodney  
"HST observations of Type Ia Supernovae at  $z > 1.5$ "

12.05-12.25 P. Hoeflich  
"Constraining the Properties of the Progenitors of SNe Ia Using their Light Curves"

12.25-13.45 LUNCH

13.45-14.05 M. Pruzhinskaya  
"Dust free supernovae Ia and dark energy"

14.05-14.25 V. Stanishev  
"IFU spectroscopy of host galaxies of SNe Ia"

14.25-16.35 - LEARNING FROM SUPERNOVA REMNANTS

14.25-15.05 K. Long (invited)  
"Supernova Remnants and their Progenitors"

15.05-15.25 P. Ruiz-Lapuente  
"Survey for the binary progenitor of SN 1006"

15.25-15.55 Coffee Break

15.55-16.15 W. Kerzendorf  
"Type Ia progenitor hunt in ancient remnants"

16.15-16.35 A. Chiotellis  
"The impact of Type Ia progenitor systems on the observational properties of Type Ia supernovae and their remnants"

16.35-16.50 Saurabh Jha  
"Peculiar Type-Ia Supernovae: Constraining Progenitors and Explosion Models"

#### **Session 2: SYMBIOTIC BINARIES**

16.50-17.15 J. Mikolajewska (invited)  
"Symbiotic stars as possible progenitors of SNIa: System Parameters and Overall Outlook"

17.15-17.40 Jenő Sokoloski (invited)  
"Symbiotic stars as possible progenitors of SNIa: Accretion and Outflows"

17.40-18.00 S. Mohamed

18-18.20 Mystery object of the day  
S. Mereghetti  
"The progenitor of a Ia with a "short delay time"?"

***18.30 Reception at Caffè Pedrocchi: drinks, appetizers, cookies***

### **TUESDAY JULY 5**

**8.50-10.20 SUPERSOFT X-RAY SOURCES - Moderator: Bob Kirshner**

Panelists: M. Gilfanov, M. Kato, R. Di Stefano, M. Orio, M. Nielsen, K. Lepo

M. Gilfanov  
"Supersoft X-ray Luminosity in External Galaxies"

K. Lepo  
"Ultra-Soft Sources as Type Ia progenitor candidates"

M. Nielsen  
"Obscuration of single degenerate type-Ia supernova progenitors in the

stellar winds of companion stars."

R. Di Stefano, M. Kato: Comments

10.20-10.50 Coffe Break

**10.50-15.30 THE EVOLUTION**

10.50-11.30 P. Marigo (invited)

"AGB evolution and the initial-final mass relation of single CO WD"

11.30-12.00 E. Garcia-Berro (invited)

"The formation and evolution of ONE white dwarfs: prospects for the AIC"

12.00-12.30 C. Tout (invited)

"White dwarf remnants of binary stars evolution"

12.30-13.45 LUNCH

13.45-14.05 N. Soker

"Double degenerate merging during the common envelope phase"

14.05-14.25 I. Hachisu

"A Single Degenerate Progenitor Model of Type Ia Supernovae Highly Exceeding the Chandrasekhar Mass Limit"

14.25-14.45 H. Ge

"Stellar Adiabatic Mass-loss model and its applications in common envelope evolution"

14.45-15.05 B. Gaensicke and D. de Martino

"Failed SNe Ia"

15.05-15.20 M. R. Schreiber

"Evidence for primary mass growth in Cataclysmic Variables"

15.20-15.25 poster presentations

15.25-15.55 Coffee Break

**15.55-18.25 CANDIDATE PROGENITORS I - NOVA ERUPTIONS"**

15.55-16.35 J. Jose (invited)

"Classical and recurrent nova models"

16.35 17.05 M. Kato (invited)

"Novae and Accreting WDs as SN Ia Progenitors"

17.05 17.45 R. Williams (invited)

"Inferences for CV evolution from spectroscopy"

17.45 -18.15

K. Page (invited)

"Swift observations of novae"

*20.45 STRINGS CONCERT, UNIVERSITY CONCERT HALL, Piazza Capitanato*

**WEDNESDAY JULY 6**

**8.50-13.30 CANDIDATE PROGENITORS 2 "COMPARISONS, AND THE RECURRENT NOVA PANEL"**

8.50-9.30 M. Livio (invited)  
"On SNe Ia progenitors"

9.30-10.00 M. Henze (invited)  
"Classical novae as supersoft X-ray sources in the Andromeda galaxy M31"

10.00-10.20 T. Rauch  
"White Dwarf Model Atmospheres"

10.20-10.50 G.C. Anupama (invited)  
"Recurrent Novae: What do we know about them?"

10.50-11.20 Coffee Break

**11.20-13.30 Recurrent Nova discussion. Moderator: Noam Soker**

15 min presentations by S. Starrfield, M. Bode, M. Orio, K. Mukai, D. Buckley

Comprehensive title (see individual abstracts in booklet):

"A new model (Starrfield) - and really new data (high and very high energy, high resolution spectra, the recent recurrent novae): how do they change the scenario?"

13.30-14.30 LUNCH

*14.45 Leaving for Verona, Return expected at 19.30*

*20.45 Mario Livio's public conference*

**THURSDAY JULY 7**

**9-12.05 CANDIDATE PROGENITORS 3 - "DOUBLE DEGENERATES AND... OBSERVATIONAL FACTS TO KEEP IN MIND"**

9.00-9.40 T. Marsh (invited)  
"Double White Dwarfs"

9.40-10.15 F. Valsecchi  
"Tidally-Induced Apsidal Precession in Double White Dwarfs: a new mass measurement tool with LISA" followed by

M. Benacquista & A. Stroeer  
"Detecting Double progenitors as SNe Ia with LISA"

10.15-10.45

**POSTERS PRESENTATIONS**

11.10-11.35 M. Kilic

"Double White Dwarf Mergers"

11.35-11.55 30 Mystery object of the day: A. Pagnotta

"Strong Evidence of a Double-Degenerate Progenitor for One Particular Type Ia Supernova"

**12.05-16.20 THE CONSTRAINTS FROM THE OBSERVATIONS**

11.55-12.35 F. Patat (invited)

"The connection between recurrent novae and some type Ia supernovae"

12.35-13.50 LUNCH

13.50-14.10 A. Sternberg

"Evidence for Circumstellar Material in Type Ia Supernovae via Sodium Absorption Features"

14.10-14.30 L. Chomiuk

"Constraints on the Progenitors of SNe Type Ia"

14.30-14.50 D. Townsley

"Making the Connection: Evaluating How Progenitor Properties Influence Type Ia Supernova Appearance"

14.50-15.10 E. Regos

"Progenitor Evolution and Dark Energy Time Variation from CLASH SNe Ia"

15.10-15.30 E. Voss

"Observational limits on the SNIa production in stellar clusters"

15.30-15.50 E. Scannapieco

"Constraining Models of Type Ia Supernova Progenitors"

15.50-16.10 C. Pritchett

"The Delay Time Distribution for Type Ia Supernovae from the SNLS Survey"

16.10-16.40 Coffee Break

**16.50 => FRIDAY: EXPLOSION MODELS**

16.40 17.20 K. Nomoto "Type Ia supernova models" (invited)

17.20 17.50 F. Roepke (invited)

"Thermonuclear supernova explosions from white dwarfs in different progenitor systems"

17.50 18.20 S. Sim (invited)

"Type Ia supernovae from sub-Chandrasekhar mass white dwarfs"

*19.20 Leaving by bus for Conference Dinner on the Colli Euganei*

**FRIDAY July 8**

**9 10.30 POPULATION SYNTHESIS ROUND TABLE (part 1)**

G. Nelemans (Invited) 25 min (questions during the discussion)  
"Double White Dwarfs"

N. Mennekens 15 min  
"Two distributions shedding light on supernova Ia progenitors:  
delay times and G-dwarf metallicities"

J. Claves 15 min  
"Supernovae type Ia and the uncertainties in their progenitor evolution"

M. Moe 15 min  
"The effects of common envelope and tidal evolution on the rates of SNe Ia"

Discussion 20 min

10.30-11.00 Coffee Break

**11 12.30 POPULATION SYNTHESIS ROUND TABLE (part 2)**

L. Greggio 15 min

B. Wang 15 min  
"Helium star donor channel to type Ia supernovae and their surviving  
companion stars"

L. Piersanti 15 min  
"He-accreting CO WDs as possible progenitors of SNe Ia"

L. Yungelson 15 min  
"Type Ia Supernovae and Supersoft X-ray Sources"

Discussion 30 min

13.40 14 Di Stefano

14-15.10 Alternative models

F. Forster, R. Pakmor, C. Zhu, J. Guillochon, the titles in order are:

"Hydrostatic carbon burning in carbon oxygen white dwarfs"

"Thermonuclear supernovae from violent mergers of massive CO white dwarfs"

"Properties of CO White Dwarf Merger Remnants"

"Surface Detonations in Double Degenerate Binary Systems Triggered  
by Accretion Stream Instabilities"

Questions/Discussions at the end

15.10-16 MORE ON MYSTERY OBJECTS

15.10-15.30 Stella Kafka

"The changing nature of QU Car: SN Ia progenitor or a hoax?"

15.30-16.00 G. Tovmassian

"SDSS0018+3454: a CV, LMXB or Symbiotic Binary?"

**16.00-17.15 FINAL DISCUSSION: PLEASE STAY !!!**

20 minutes talks by 3 "Mystery Speakers", in addition to the audience, a panel of "leaders" in each field will ask them some questions

<b>First name</b>	<b>Last Name</b>	<b>Affiliation</b>	
G.C.	Anupama	Indian Institute of Astrophysics	India
Akira	Arai	Kyoto Sangyo University	Japan
Levon	Aramyan	Yerevan State University	Armenia
Christophe	Balland	LPNHE	France
Solen	Balman	Middle East Technical University	Turkey
Matthew	Benacquista	Center for Gravitational Wave Astronomy	USA
Stefano	Benetti	INAF - OAPd	Italy
Antonio	Bianchini	Padova University	Italy
David	Buckley	South African Large Telescope (SALT)	South Africa
Filomena	Bufano	INAF-Osservatorio Astronomico di Catania	Italy
Ramon	Canal	Dept. of Astronomy, University of Barcelona	Spain
Enrico	Cappellaro	INAF, Osservatorio Astronomico di Padova	Italy
Emanuela	Chiosi	Osservatorio Astronomico di Padova	Italy
Alexandros	Chiotellis	Utrecht University	Netherlands (Greece)
Stefano	Ciroi	Padova University	Italy
Laura	Chomiuk	Harvard-Smithsonian Cfa/NRAO	USA
Valentina	Cracco	Padova University	Italy
Joke	Claeys	Utrecht University	Netherlands
Ashkbiz	Danehkar	Macquarie University	Australia (Iran)
Domitilla	de Martino	INAF Capodimonte Astronomical Obs.	Italy
Marco	De Pascale	INAF Astronomy Observatory of Padova	Italy
Massimo	Della Valle	INAF-Napoli	Italy
Rosanne	Di Stefano	Harvard-Smithsonian Center	USA
Lilia	Ferrario	Australian National University	Australia (Italy)
Francisco	Forster	Universidad de Chile	Chile
Boris	Gaensicke	University of Warwick	UK
Enrique	Garcia-Berro	Universitat Politecnica de Catalunya	Spain
Hongwei	Ge	Yunnan Observatory	China
Diego	Gonzalez	UNAM Ensenada, Mexico	Mexico (Columbia)
Laura	Greggio	INAF-OAPd	Italy
Marat	Gilfanov	MPA	Germany
James	Guillochon	UC Santa Cruz	USA
Izumi	Hachisu	University of Tokyo	Japan
Artur	Hakobyan	Byurakan Astrophysical Obs./Yerevan State Univ.	Armenia
Norsiah	Hashim	University of Malaysia	Malaysia
Diego	Hernandez	UNAM	Mexico
Martin	Henze	Max Planck Institute for Extraterrestrial Physics	Germany
Peter	Hoeflich	Department of Physics	USA (Germany)
Narges	Jamialahmadi	student	Iran
Saurabh	Jha	Rutgers University	USA
Jordi	Jose	Universidad Politecnica de Catalunya	Spain
Stella	Kafka	NASA/NAI and CIW/DTM	USA (Greece)
Yasuomi	Kamiya	University of Tokyo / IPMU	Japan
Mansi	Kasliwal	Caltech	USA (India)
Mariko	Kato	Keio University	Japan
Hideyo	Kawakita	Koyama Astron. Obser./Kyoto Sangyo University	Japan
Edwin	Kellogg	Harvard/Smithsonian Cfa	USA
Wolfgang	Kerzendorf	Mt Stromio Observatory	Australia
Mukremin	Kilic	Smithsonian Astrophysical Observatory	USA (Turkey)
Robert	Kirshner	Harvard-Smithsonian Center	USA
Oliver	Krause	Subaru Telescope, Nat.Astr. Obs.of Japan	Japan
Laurits	Leedjarv	Tartu Observatory	Estonia
Bruno	Leibundgut	ESO	Germany
Kelly	Lepo	University of Toronto	Canada
Vladimir	Lipunov	Sternberg Astronomical Ins., Moscow State Univ.	Russia
Mario	Livio	Space telescope Science Institute (STScI)	USA (Israel)
Knox	Long	STScI	USA



Paola	Marigo	University of Padova, Astronomy Department	Italy
Thomas	Marsh	University of Warwick	UK
Michael	Maxwell	University of Central Lancashire	UK
Curtis	McCully	Rutgers, The State University of New Jersey	USA
Nicki	Mennekens	Vrije Univ.	Belgium
Sandro	Mereghetti	INAF IASF Milano	Italy
Joanna	Mikolajewska	N. Copernicus Astronomical Center	Poland
Max	Moe	Harvard University	USA
Shazrene	Mohamed	University of Bonn	Germany (Zimbabwe)
Martine	Mouchet	APC	France
Koji	Mukai	NASA/GSFC/CRESST and UMBC	USA (Japan)
Ulisse	Munari	INAF Astronomy Observatory of Padova	Italy
Masayoshi	Nagashima	Kyoto Sangyo University	Japan
Gijs	Nelemans	Raboud University Nijmegen	Netherlands
Mikkel	Nielsen	Radboud University Nijmegen	Netherlands
Ken'ichi	Nomoto	IPMU/University of Tokyo	Japan
Jun	Okumura	Kyoto University	Japan (India)
Marina	Orio	INAF-Padova and Univ. of Wisconsin	Italy, USA
Magdalena	Otulakowska	N. Copernicus Astronomical Center	Poland
Rachid	Ouyed	University of Calgary	Canada
Kim	Page	University of Leicester	UK
Ashley	Pagnotta	Lousiana State University	USA
Nando	Patat	ESO	Germany (Italy)
Yakup	Pekon	Middle East Technical University	Turkey
Gohar	Petrosyan	Yerevan State University	Armenia
Luciano	Piersanti	INAF-OATe	Italy
Onno	Pols	Astronomical Institute, Utrecht University	Netherlands
Dina	Prialnik	Tel Aviv University	Israel
Chris	Pritchett	University of Victoria	Canada
Maria	Pruzhinskaya	Sternberg Astronomical Ins., Moscow State Univ.	Russia
Maria Letizia	Pumo	INAF - OAPd	Italy
Thomas	Rauch	Eberhard Karls Univ.	Germany
Eniko	Regos	ELTE/CERN	Switzerland
Alvio	Renzini	INAF	Italy
Valerio	Ribeiro	Astrophysics, Cosmology & Gravity Center	UK (Mozambique)
Steven	Rodney	The Johns Hopkins University	USA
Friedrich	Roepcke	max Planck for Astrophysics, Garching	Germany
Pilar	Ruiz-Lapuente	University of Barcelona	Spain
Mark	Rushton	Jeremiah Horrocks Institute	UK
Tenay	Saguner	Universita degli Studi di Padova	Italy
Dave	Sahman	Sheffield University	UK
A. Talat	Saygac	Istanbul University, Faculty of Science	Turkey
Evan	Scannapieco	Arizona State University	USA
Linda	Schmidtobreick	European Southern Observatory	Chile
Matthias R.	Schreiber	Univ. of Valparaiso, Dept. Physics and Astronomy	Chile
Sergey	Shugarov	Sternberg Astronomy Institute	Russia
Stuart	Sim	RSAA, ANU	Australia
Jonathan	Smoker	European Southern Observatory	Chile
Noam	Soker	Technion	israel
Jennifer (Jenc)	Sokoloski	Columbia University	USA
Sumner	Starrfield	Arizona State University	USA
Assaf	Sternberg	Weizmann Institute of Science	Israel
Nao	Suzuki	Lawrence Berkeley National Lab	USA
Anna	Tatarnikova	Sterberg Astronomical Institute	Russia
Silvia	Toonen	IMAPP, Radboud Univ. Nijmegen	Netherlands
Luis	Torres	Instituto de Astronomia - UNAM	Mexico (Columbia)
Christopher	Tout	University of Cambridge	UK
Gagik	Tovmassian	UNAM, Ensenada	Mexico (Armenia, USA)

Dean	Townsley	University of Alabama	USA
Takuji	Tsujimoto	National Astronomical Observatory of Japan	Japan
Massimo	Turatto	INAF Osservatorio di Trieste	Italy
Francesca	Valsecchi	CIERA and Northwestern University	USA
Irina	Voloshina	Sternberg Astronomical Institute	Russia
Rasmus	Voss	Radboud University Nijmegen	Netherlands
Bo	Wang	Yunnan Observatory, Chinese Academy of Sciences	China
Ronald	Webbink	University of Illinois	USA
Dayal	Wickramasinghe	Australian National University	Australia
Robert	Williams	STScI	USA
Masayuki	Yamanaka	Hiroshima University	Japan
Lev	Yungelson	Institute of Astronomy	Russia
Luca	Zampieri	INAF-Astronomical Observatory of Padova	Italy
Polina	Zemko	Moscow State University	Russia
Chenchong	Zhu	University of Toronto	Canada

# IAU Symposium 281

## Binary Paths to type Ia Supernovae Explosions

Three months after the end of this symposium, the Nobel prize for physics was awarded to three astrophysicists who inferred the existence of dark energy from type Ia supernovae data. Undoubtedly, it was a great year for scientists working on the mystery represented by type Ia supernovae. The environment of the IAU Symposium 281 resonated with energy and enthusiasm, the sessions were exciting and full of ideas. Although the number that gathered at Padova in July of 2011 was smaller than in other, more general symposia, we are proud to say that we organized the meeting of a vibrating, very active group of scientists.

131 participants came from 30 different countries. A third were women, reflecting well the present composition of the world's astronomers' population. We had made an experiment, constituting a Scientific Organizing Committee of 16 women and one man. This did not attract a larger women to participate than the actual fraction of women working in our field, however we believe it was a positive experience, creating a feeling of a gender-bias-free atmosphere and facilitating young women's participation in the discussions. It was also a small provocative action to make our colleagues talk about gender biases in astronomy, and we think it worked positively. Graduate students and young post-doctoral fellows were a large fraction and the attendees. The many young participants brought enthusiasm and new ideas. The atmosphere was thus refreshing, charged with expectations and possibilities.

I have only one regret: since we had to announce the symposium dates a year and a half in advance, thereby missing the possibility to adjust the dates depending on new proposed conference of related subjects. A large supernova conference was held in Australia shortly before our symposium on the progenitors, so potential US participants found it difficult to travel to two different continents within a fortnight. However, the participation of the supernova scientists, theorists and observers alike, was fundamental for the success of the symposium, meant to bring together different communities of astrophysicists: those working on supernovae, on close binary evolution, and on binary populations. A previous "SNova" semester-long program and conference were held 5 years earlier at the Kavli Institute in Santa Barbara. Those of us who took part either of them came home enriched and energized. Our aim was to rekindle the spirit of this previous experience and I am proud to say we were successful.

There were many highlights in this conference and by mentioning a few I do not want to downplay the importance of any of the other topics. As a "nova" scientist, I found it fascinating to learn about the variety of possible models leading to the

explosion and the possibility of “sub-Chandra” models seems to be intriguing and important to explore. A short talk by S. Mohamed on detailed simulations of the Roche lobe overflow seemed innovative and sparked many questions and discussions. The possibility of detecting gravitational waves from close binaries with white dwarfs with LISA in future years is very exciting. The population synthesis calculations in the new era of large surveys with unprecedented statistics are more important than ever. The unexpected bonus of three eruptions of luminous recurrent novae within a little over two years before this Symposium, allowed new estimates of WD masses and compositions. The possibility that many recurrent novae may host neon oxygen white dwarfs seems less unlikely now. Brand new spectra of the 10m South African large Telescope were presented almost in “real time”. Optical spectroscopy appears also to be fundamental in probing the environment in which SNe Ia explode, and Patat’s talk on the likely “recurrent-nova-like” circumstellar environment opened up new possibilities to search for the signature of single degenerate progenitors. Kilic’s radial velocity studies are paving a new avenue to search for double degenerates and obtain statistics of these systems.

Marat Gilfanov was invited to take part in a debate with several of us to defend his position that the integrated supersoft X-ray luminosity of galaxies may rule out a large contribution of single degenerate progenitors. Many of us had a different opinion, so we confronted results and theoretical predictions. To me, this all science is about, constantly testing one’s results and confronting them with others. I am proud to say we achieved this goal in Padova. Throughout the Symposium we experienced that tense and vibrating atmosphere that fosters intellectual and scientific development.

For me, the best part of the conference was the participation of three very young scientists from developing countries, at the initial stages of graduate studies, who obtained a grant to participate not only in the Padova conference, but also doing research in Italy for the whole Summer. Levon Aramayan from Armenia, Narges Jami-Aliahamadi from Iran and Norsia Hashim from Malaysia were a wonderful presence with their fresh ideas and enthusiasm. Spending the Summer in contact with them and following their first steps in scientific research was very rewarding and made even the days of the Symposium more meaningful for me.

Many thanks to the “mystery speakers” selected without knowledge of the other participants to summarize the symposium at the end. Mukremin Kilic, Lilia Ferrario and Alvio Renzini did an excellent job focusing on “what we were taking home” from this conference. Special thanks go to the participants who gave public talks to the general public in Padova: Mario Livio, Lilia Ferrario and Bob Williams. Their contribution was greatly appreciated by a large number of people in the community in which we live!

Finally, we offered an interesting and entertaining social program, with nice welcome parties and a wonderful dinner on the Colli Euganei. However, the restrictions on the registration fee and the greatly increased publication cost of the proceedings posed some challenges and made the finances difficult to manage for a small symposium. For instance, the majority of the scientific committee thought that a common venue for the lunches was important to keep up the discussions and to save time in the middle of the day, but unfortunately we could not offer a discount price and guarantee the restaurant a minimum number of participants because there was no way to include lunch in the registration fee budget. I will not dwell here on other finance-related problems, but I would like to let the IAU know that more flexibility on the registration fee would actually make the total cost to the participants smaller, not larger. This is especially important for the smaller, more specifically focused symposia, which I believe are also very important to bring forward the scientific mission of the IAU.

# IAU POST MEETING REPORT FORM

1. Meeting Number: IAU Symposium 282
2. Meeting Title: “From Interacting Binaries to Exoplanets: Essential Modeling Tools”  
<http://www.astro.sk/IB2E/>
3. Coordinating Division: Division V Variable Stars  
Supporting Divisions: Division III Planetary Systems Sciences  
Division IV Stars  
Division IX Optical & IR Techniques  
  
Supporting Commissions:  
C25 Stellar Photometry & Polarimetry C27 Variable Stars  
C29 Stellar Spectra C36 Theory of Stellar Atmospheres  
C42 Close Binary Stars C53 Extrasolar Planets (WGESP)  
C54 Optical & Infrared Interferometry
4. Dedication of meeting:  
*This meeting commemorated the 40<sup>th</sup> anniversary of the first model atmosphere and binary star synthesis codes, as well as the 110<sup>th</sup> anniversary of the birth of Dr. Antonín Bečvář, founder of the Skalnaté Pleso Observatory and author of several famous atlases and catalogues: Atlas Coeli, Atlas Borealis, Atlas Eclipticalis and Atlas Australis which were used nightly by astronomers around the world for almost half a century.*
5. Location (city, country): Tatranska Lomnica, Slovak Republic
6. Dates of meeting: July 18 - 22, 2011
7. Number of participants: 207 registered for the meeting (194 astronomers, 13 others);  
189 attended the meeting (177 astronomers, 12 others)
8. List of represented countries: 31 countries  
Australia, Austria, Bulgaria, Canada, Chile, Croatia, Czech Republic, Finland, France, Germany, Greece, Hungary, Iran, Israel, Italy, Japan, Korea, Latvia, Netherlands, New Zealand, Poland, Portugal, Russia, Serbia and Montenegro, Slovak Republic, Spain, Switzerland, Turkey, Ukraine, United Kingdom, United States
9. Report submitted by: Mercedes Richards and Ivan Hubeny, SOC Chairs
10. Date and place: August 5, 2011 in Tatranska Lomnica, Slovakia
11. Signature of SOC Chairperson:

# IAUS 282: **From Interacting Binaries to Exoplanets: Essential Modeling Tools**

## **SOC: Scientific Organizing Committee**

Mercedes Richards, chair (USA)  
Ivan Hubený, co-chair (USA)  
Dmitry Bisikalo (Russia)  
Ján Budaj (Slovakia)  
Osman Demircan (Turkey)  
Gojko Djurasevic (Serbia)  
Edward Guinan (USA)  
Petr Hadrava (Czech Republic)  
Petr Harmanec (Czech Republic)  
Ladislav Hric (Slovakia)  
Pavel Koubský (Czech Republic)  
Panagiotis Niarchos (Greece)  
Geraldine Peters (USA)  
Theodor Pribulla (Slovakia)  
Didier Queloz (Switzerland)  
Philippe Stee (France)  
Paula Szkody (USA)  
Juraj Zverko (Slovakia)  
Simon Portegies Zwart (Netherlands)

## **LOC: Local Organizing Committee**

Theodor Pribulla, chair  
Ladislav Hric, co-chair  
Anna Bobulová  
Ján Budaj  
Zuzana Cariková  
Drahomír Chochol  
Ľubomír Hambálek  
Richard Komžík  
Emil Kundra  
Matej Sekeráš  
Augustín Skopal  
Martin Vaňko  
Juraj Zverko

IAUS 282: *From Interacting Binaries to Exoplanets: Essential Modeling Tools*  
Astronomical Institute, Slovakia, July 17 – 22, 2011

**Sunday July 17, 2011**

13:00 – 18:00 Registration

18:00 *Welcome Party/Cocktails* (at the conference hotel Academia)

**Monday July 18, 2011**

7:30 – 10:00 Registration

**Opening Ceremony**

*Chair: Virginia Trimble*

8:30	Aleš Kucera	Welcome by Institute Director
8:40	T. Pribulla/L. Hric	Welcome by LOC Chairs
8:45	M. Richards/ I. Hubeny	Welcome by SOC Chairs
8:50	Petr Harmanec	Shaking the Pot of Modeling Tools: Some Open Problems in the Field

**Session A: Multiwavelength Photometry and Spectroscopy of Interacting Binaries**

*Chair: Karen Bjorkman*

9:05	Edward Guinan	Advances in Telescope and Detector Technology - Impacts on the Study and Understanding of Binary Star and Exoplanet Systems
9:40	Panagiotis Niarchos	Ground-based and Space Observations of Interacting Binaries
10:05	Alceste Bonanos	Techniques for Observing Binaries in Other Galaxies
<b>10:30</b>	<b>Coffee Break</b> and Mini Talks: A01–A35 (11 talks, <i>Chair: Mercedes Richards</i> )	
11:35	Laurent Eyer	The Impact of Gaia and LSST
12:10	Carla Maceroni	The Impact of CoRoT and Kepler
12:35	Geraldine Peters	Use of the Virtual Observatory Databases in Binary Star Research
<b>13:00</b>	<b>Lunch</b>	

**Session B: Observations and Analysis of Exoplanets and Brown Dwarfs**

*Chair: Wilhelm Kley*

14:30	Didier Queloz	Exoplanets from the Techniques and Analysis Tools Perspective
15:05	Thomas Pasternacki	Homogeneous Study of the Transit Light Curves of CoRoT Exoplanets
15:30	Styliani Kafka	Challenges to Observations of Low Mass Binaries
<b>16:05</b>	<b>Coffee Break</b> and Mini Talks: B01—B15, C01—C10 (8 talks, <i>Chair: Ivan Hubeny</i> )	
17:10	Katelyn Allers	Brown Dwarfs in Binaries
17:35	Maciej Konacki	Detecting and Characterizing Exoplanets in Binary Star Systems
18:00	Panel Discussion	Sessions A, B

**Tuesday July 19, 2011**

**Session C: Imaging Techniques for Binary Stars, Brown Dwarfs, and Exoplanets**

*Chair: Theodor Pribulla*

9:00	Philippe Stee	Binaries and Multiple Systems Observed with the VLTI, NPOI and CHARA/VEGA Interferometric Eyes
9:35	Eugene Serabyn	Observing Close to Bright Stars Using Vortex Coronagraphy, Visible-Wavelength Adaptive Optics, and Nulling Interferometry
10:00	Mercedes Richards	Tomography of Interacting Binaries
<b>10:25</b>	<b>Coffee Break</b>	



10:45	Karen Bjorkman	Polarimetry of Close Binaries and Exoplanets
11:20	Sasha Hinkley	Adaptive Optics Imaging of Binaries, Brown Dwarfs, and Exoplanets: Present and Future
11:55	Tobias Schmidt	Direct Observations of Sub-Stellar Companions Around Young Stars
12:20	Break	
<b>12:30</b>	<b>Official Excursion</b>	

### **Wednesday July 20, 2011**

#### **Session D: Model Atmospheres of Stars, Interacting Binaries, Disks, Exoplanets, and Brown Dwarfs**

*Chair: Orsola De Marco*

9:00	Piercarlo Bonifacio	Calculation of LTE Atmospheres with ATLAS, MARCS and CO5BOLD
9:25	Ivan Hubeny	Basic Tools for Modeling Stellar and Planetary Atmospheres
10:00	John Hillier	Hot Stars with Winds: The CMFGEN Code
<b>10:25</b>	<b>Coffee Break</b>	and Mini Talks: D01—D11 (6 talks, <i>Chair: Robert Wilson</i> )
11:30	France Allard	Stellar to Substellar Atmosphere 2-3D RHD Simulations with Cloud Formation and Rotation using CO5BOLD and PHOENIX
12:05	Hilding Nielson	Comparison of Limb-Darkening Laws from Plane-Parallel and Spherical ATLAS Model Atmospheres
12:30	Tomislav Jurkic	Modelling of Dust Around the Symbiotic Nova RR Tel
<b>12:55</b>	<b>Lunch</b>	

#### **Session E: Synthetic Light Curves, Velocity Curves, Spectra of Binary Stars, and Spectra of Binaries with Accretion Structures**

*Chair: Philippe Stee*

14:30	Andrej Prsa	Advances in Modeling Eclipsing Binary Stars in the Era of Large All-Sky Surveys with EBAI and PHOEBE
15:05	Theodor Pribulla	ROCHE: Analysis of Eclipsing Binary Multi-Dataset Observables
15:30	Albert Linnell	The BINSYN Program
<b>15:55</b>	<b>Coffee Break</b>	and Mini Talks: E01—E24 (12 talks, <i>Chair: Geraldine Peters</i> )
17:00	Stefan Mochnacki	Application of the GDDSYN Method in the Era of KEPLER, CoRoT, MOST and BRITTE
17:25	Ján Budaj	Synthetic Spectra and Light Curves of Interacting Binaries and Exoplanets with Circumstellar Material: SHELLSPEC
18:00	Panel Discussion	Sessions C, D, E

### **Thursday July 21, 2011**

#### **Session F: Techniques for Analysis of Spectra and Light Curves**

*Chair: France Allard*

9:00	Petr Hadrava	The Disentangling of Stellar Spectra
9:35	Kresimir Pavlovski	Quantitative Spectroscopy of Binary Stars
10:00	Slavek Rucinski	Spectral Analysis: The Broadening Function Technique
<b>10:25</b>	<b>Coffee Break</b>	and Mini Talks: F01—F07, G01—G13 (10 talks, <i>Chair: Edward Devinney</i> )
11:15	Shay Zucker	TODCOR - A Two Dimensional Correlation Technique
11:50	Simon Albrecht	The Long History of the Rossiter-McLaughlin Effect and its Recent Applications
12:15	Amaury Triaud	The Rossiter McLaughlin Effect on Transiting Planets and Low Mass Eclipsing Binaries
12:40	Zdenek Mikulasek	Period Analyses Without O-C Diagrams

**13:05 Lunch**

**Session G: Formation and Evolution of Binary Stars, Brown Dwarfs, and Planets**

*Chair: Peter Eggleton*

- 14:30 Cathie Clarke The Formation of Binary stars  
15:05 Christopher Tout Non-conservative Evolution of Binaries with STARS  
15:40 Satoshi Mayama Direct Imaging of Bridged Twin Protoplanetary Disks in a Young Multiple Star  
**16:05 Coffee Break** and Mini Talks: G14—G30 (8 talks, *Chair: Dmitry Bisikalo*)  
16:55 Wilhelm Kley Formation and Evolution of Exoplanets  
17:30 Adam Burrows Towards a Theory for the Atmospheres, Structure, and Evolution of Giant Exoplanets  
18:05 Panel Discussion Sessions F, G

**19:30 Conference Reception**

**Friday July 22, 2011**

**Session H: Hydrodynamic Simulations of Exoplanets and Mass Transfer in Interacting Binaries**

*Chair: Adam Burrows*

- 9:00 Dmitry Bisikalo Gas Dynamic Simulations of Mass Transfer in Cataclysmic Variables  
9:35 Orsola De Marco Hydrodynamic Simulations of the Common Envelope Binary Interaction  
10:00 Tatiana Demidova Hydrodynamics of Young Binaries with the Low-mass Secondary  
**10:25 Coffee Break** and Mini Talks: H01—H04 (3 talks, *Chair: Mercedes Richards*)  
11:15 Helmut Lammer Simulations of Exoplanetary Atmosphere Environments  
11:50 Ian Dobbs-Dixon 3D Models of Exoplanet Atmospheres  
12:15 Elke Pilat-Lohinger Dynamical Stability and Habitability of Extrasolar Planets  
12:40 Panel Discussion Session H  
**13:00 Lunch**

**Closing Ceremony**

*Chair: Alan Batten*

- 14:30 Pavel Koubsky Summary of Observational Techniques  
14:50 Adam Burrows Summary of Theoretical Techniques  
15:10 Theodor Pribulla LOC Closing Remarks  
15:20 Mercedes Richards SOC Closing Remarks

**17:00 Education and Public Outreach Event in Poprad (in Czech language)**

Ivan Hubeny Hledani a studium planet mimo Slunecni soustavu  
*Detecting and Studying Exoplanets*

**Saturday July 23, 2011**

9:00 Tour of Skalnaté Pleso Observatory

## IAU Symposium 282: List of Participants

Delegate Name	Organisation
Dr. Simon Albrecht	Massachusetts Institute of Technology, Kavli Institute for Astrophysics and Space Research, USA
Ms. Julia Alfonso-Garzon	Centro de Astrobiologia (INTA-CSIC), Spain
Dr. France Allard	Centre de Recherche Astrophysique de Lyon, Ecole Normale Supérieure de Lyon, France
Prof. Katelyn Allers	Bucknell University, USA
Dr. Roman Baluev	Central (Pulkovo) Astronomical Observatory of Russian Academy of Sciences, Russia
Ms. Daniela Barria	Universidad de Concepcion-ESO, Chile
Prof. Alan Batten	National Research Council Canada, Canada
Ms. Carolina Bergfors	Max-Planck-Institute for Astronomy, Germany
Prof. Dmitry Bisikalo	Institute of astronomy of Russian Academy of Science, Russia
Prof. Jon Bjorkman	Dept. of Physics and Astronomy, University of Toledo, USA
Prof. Karen Bjorkman	Dept. of Physics and Astronomy, University of Toledo, USA
Prof. Nikolai Bochkarev	Sternberg Astronomical Institute at Lomonosov Moscow State University, Russia
Dr. Alceste Bonanos	IAA, National Observatory of Athens, Greece
Dr. Mariangela Bonavita	Department of Astronomy and Astrophysics, University of Toronto, Canada
Dr. Piercarlo Bonifacio	GEPI, Observatoire de Paris, CNRS, Univ Paris Diderot, France
Dr. Jan Budaj	Astronomical Institute, Tatranska Lomnica, Slovakia
Dr. Edwin Budding	Carter Observatory and Dept. of Physics & Astronomy, University of Canterbury, New Zealand
Prof. Adam Burrows	Department of Astrophysical Sciences, Princeton University, USA
Ms. Zuzana Carikova	Astronomical Institute, Slovak Academy of Sciences, Slovakia
Ms. Lale Celik	Ankara University, Faculty of Science, Astronomy and Space Sciences Department, Turkey
Dr. Carlson Chambliss	Kutztown University, USA
Dr. Drahomir Chochol	Astronomical Institute of the Slovak Academy of Sciences, Slovakia
Mr. Marek Chrastina	Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, Czech Republic
Dr. Eleftheria Christopoulou	Department Of Physics, University of Patras, Greece
Prof. Cathie Clarke	Institute of Astronomy, University of Cambridge, UK
Mr. Attila Cseki	Astronomical Observatory of Belgrade, Serbia and Montenegro
Dr Szilard Csizmadia	German Aerospace Center, Institute for Planetary Research, Germany
Mr. Sebastian Daemgen	ESO Garching, Germany
Mr. Ashkbiz Danekhar	Macquarie University, Australia
Dr. Avril Day-Jones	Universidad de Chile, Chile
Prof. Orsola De Marco	Macquarie University, Australia
Dr. Tatiana Demidova	Pulkovo Observatory of Russian Academy of Sciences, Russia
Prof. Osman Demircan	Canakkale Onsekiz Mart University, Department of Physics, Canakkale, Turkey
Prof. Edward Devlinney, Jr.	Department of Astronomy & Astrophysics, Villanova University, USA
Dr. Gojko Djurasevic	Astronomical Observatory of Belgrade, Serbia and Montenegro
Dr. Ian Dobbs-Dixon	University of Washington, USA
Mgr. Marek Drozd	Mt. Suhora Astronomical Observatory, Krakow (Cracow) Pedagogical University, Poland
Dr. Peter Eggleton	Lawrence Livermore National Laboratory, USA
Dr Laurent Eyer	Observatoire de Geneve, Switzerland
Dr. Juris Freimanis	Ventspils International Radio Astronomy Centre, Ventspils University College, Latvia
Dr. Barbara Funk	Institut for Astronomy, University of Vienna, Austria

Dr. Rudolf Galis	P. J. Safarik University, Slovakia
Dr. Kosmas Gazeas	European Space Agency - ESTEC, Netherlands
Ms. Joana Gomes	University of Hertfordshire, UK
Dr. Jonay Gonzalez Hernandez	Instituto de Astrofisica de Canarias, Spain
Dr. Jose Groh	Max-Planck Institute for Radioastronomy, Germany
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Prof. Petr Hadrava	Astronomical Institute of the Academy of Sciences of the Czech Republic
Ms. Kelly Hambleton	Jeremiah Horrochs Institute, University of Central Lancashire, UK
Prof. Dr. Petr Harmanec	Astronomical Institute of the Charles University of Prague, Czech Republic
Dr. Artie Hatzes	Thueringer Landessternwarte Tautenburg, Germany
Dr. Tibor Hegedus	Baja Astronomical Observatory, Hungary
Prof. D. John Hillier	University of Pittsburgh, USA
Dr. Sasha Hinkley	California Institute of Technology, USA
Dr. Ladislav Hric	Astronomical Institute, Slovak Academy of Sciences, Slovakia
Dr. Ivan Hubeny	University of Arizona, USA
Prof. Dr. Ilian Iliev	Institute of Astronomy and Rozhen National Astronomical Observatory, Bulgarian Academy of Sciences
Dr. Lubomir Iliev	Institute of Astronomy and Rozhen National Astronomical Observatory, Bulgarian Academy of Sciences
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none Dmitry Ionov	Institute of Astronomy of the Russian Academy of Sciences, Russia
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Ms. Monika Jurkovic	Astronomical Observatory of Belgrade, Serbia and Montenegro
Dr. Zsolt Kovari	Konkoly Observatory, Hungary
Dr. Stella Kafka	NASA Astrobiology Institute and Carnegie Institution of Washington/DTM, USA
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Dr. Eugenia Karitskaya	Institute of Astronomy of RAS, Russia
Dr. Laszlo Kiss	Konkoly Observatory, Hungary
Prof. Wilhelm Kley	Institute for Astronomy & Astrophysics, University of Tuebingen, Germany
Ing. Vladimir Kolbas	Department of Physics, University of Zagreb, Croatia
Dr. Maciej Konacki	NCAC Polish Academy of Sciences, Poland
Mr. Piotr Konorski	Astronomical Observatory, University of Warsaw, Warsaw, Poland
Dr. Daniela Korcakova	Astronomical Institute, Charles University, Czech Republic
Prof. Dubravka Kotnik-Karuza	Department of Physics, University of Rijeka, Croatia
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Ms. Evgenia Koumpia	National Observatory of Athens, Greece
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Dr. Emil Kundra	Astronomical Institute, Slovak Academy of Sciences, Slovakia
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Prof. Diana Kyurkchieva	Shumen University, Bulgaria
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Dr. Jae Woo Lee	Korean Astronomy and Space Science Institute, Korea
Dr. Chung-Uk Lee	Korean Astronomy and Space Science Institute, Korea
Dr. Holger Lehmann	Thueringer Landessternwarte Tautenburg, Germany
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Mr. Alexios Liakos	Dept. Astrophysics, Astronomy and Mechanics, National and Kapodistrian University of Athens, Greece
Dr. Albert Linnell	Astronomy Department, University of Washington, USA
Dr. Steven Macenka	Jet Propulsion Laboratory, USA
Dr. Carla Maceroni	INAF- Osservatorio Astronomico di Roma, Italy
Dr. Dragomir Marchev	Shumen University, Bulgaria
Mr. Konstantinos Markakis	National Observatory of Athens, I. Metaxa & Vas. Pavlou St., P. Penteli 15236, Greece
Dr. Satoshi Mayama	The Graduate University for Advanced Studies, Kanagawa, Japan
Dr. Ronald Mennickent	Departamento de Astronomia, Universidad de Concepcion, Chile
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Prof. Zdenek Mikulasek	Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, Czech Republic
Mr. Ivan Milic	Astronomical Observatory of Belgrade, Serbia and Montenegro
Dr. David Mkrtychian	Crimean Astrophysical Observatory, Ukraine
Dr. Stefan Mochnacki	Dept. of Astronomy and Astrophysics, University of Toronto, Canada
Dr. Michele Montgomery	University of Central Florida, USA
Dr. Helena Morais	Department of Physics, I3N, University of Aveiro, Portugal
Mr. Jozef Nedoroscik	Institute of Physics, Faculty of Natural Sciences, University of P. J. Safarik, Slovakia
Dr. Hilding Neilson	Argelander Institute for Astronomy, University of Bonn, Germany
Ms. Jana Nemravova	Astronomical Institute, Faculty of Mathematics and Physics, Charles University, Czech Republic
Dr. Vitaly Neustroev	University of Oulu, Finland
Prof. Panagiotis Niarchos	Dept. Astrophysics, Astronomy and Mechanics, National and Kapodistrian University of Athens, Greece
Dr. Nikolay Nikolov	Max Planck Institute for Astronomy, Germany
Dr. Waldemar Ogloza	Cracow Pedagogical University, Poland
Dr. Katalin Olah	Konkoly Observatory of the Hungarian Academy of Sciences, Hungary
Ms. Magdalena Otulakowska-Hypka	N. Copernicus Astronomical Center of the Polish Academy of Sciences, Poland
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Prof. Kresimir Pavlovski	Department of Physics, University of Zagreb, Croatia
Prof. Geraldine Peters	University of Southern California, USA
Dr. Elke Pilat-Lohinger	Institute of Astronomy, University of Vienna, Austria
Dr. Bogumil Pilecki	Warsaw University Observatory, Warszawa, Poland
Mr. Antonio Pilello	Georg-August-Universitat Gottingen, Institut fur Astrophysik, Germany
Mgr. Eva Plavalova	Comenius University in Bratislava, Faculty of Mathematics, Physics and Informatics, Slovakia
Ms. Elena Popova	Pulkovo Observatory of Russian Academy of Sciences, Russia
Dr. Theodor Pribulla	Astronomical Institute of the Slovak Academy of Sciences, Slovakia
Dr. Andrej Prsa	Villanova University, USA
Prof. Didier Queloz	University of Geneva, Observatoire de Geneva, Switzerland
Ms. Milena Ratajczak	NCAC Polish Academy of Sciences, Poland
Dr. Phillip Reed	Kutztown University of Pennsylvania, USA
Mgr. Valeria Reckova	Hvezdaren a Planetarium, Hlohovec, Slovakia
Prof. Mercedes Richards	Pennsylvania State University, USA

Prof. Slavek Rucinski	Department of Astronomy and Astrophysics, University of Toronto, Canada
Dr. Domagoj Ruzdjak	Hvar Observatory, Faculty of Geodesy, Croatia
Ms. Mariza Sarta Dekovic	Department of Physics, University of Rijeka, Croatia
Dr. Tobias Schmidt	Astrophysikalisches Institut und Universitäts-Sternwarte Jena, Germany
Dr. Richard Schwarz	Institut efor Astronomy, University of Vienna, Austria
Ms. Klara Sejnova	Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, Czech Republic
Mgr. Matej Sekeras	Astronomical Institute of the Slovak Academy of Sciences, Slovakia
Dr. Hakan Senavci	Ankara University, Astronomy and Space Sciences Department, Tandogan, Ankara, Turkey
Dr. Eugene Serabyn	Jet Propulsion Laboratory, USA
Ms. Brigitta Sipocz	Centre for Astrophysics Research, University of Hertfordshire, UK
Dr. Petr Skoda	Astronomical Institute of the Academy of Sciences of the Czech Republic
Dr. Augustin Skopal	Astronomical Institute, Slovak Academy of Sciences, Tatranska Lomnica, Slovakia
Dr. Greg Stachowski	Mt. Suhora Astronomical Observatory, Poland
Dr. Ivanka Stateva	Institute of Astronomy and Rozhen National Astronomical Observatory, Academy of Sciences, Bulgaria
Dr. Philippe Stee	Observatoire de la Cote d'Azur - CNRS - Universite de Nice Sophia Antipolis, France
Dr. Guy Stringfellow	Center for Astrophysics and Space Astronomy, University of Colorado, USA
Dr. Davor Sudar	Hvar Observatory, Faculty of Geodesy, Zagreb, Croatia
Dr. Gyula Szabo	MTA Konkoly Observatory, Hungary
Mr. Tamas Szalai	Department of Optics and Quantum Electronics, University of Szeged, Hungary
Dr. John Southworth/Taylor	Keele University, UK
Prof. Christopher Tout	University of Cambridge, UK
Dr. Amaury Triaud	Observatoire de l'Universite de Geneve, Switzerland
Prof. Virginia Trimble	University of California, USA
Dr. Martin Vanko	Astronomical Institute, Slovak Academy of Sciences, Slovakia
Ms. Aline Vidotto	University of St Andrews, UK
Dr. Istvan Vince	Astronomical Observatory of Belgrade, Serbia and Montenegro
Ms. Carolina von Essen	Hamburger Sternwarte, Germany
Dr. Viktor Votruba	Stellar Department, Astronomical Institute, Academy of Sciences of the Czech Republic
Ms. Gemma Whittaker	University of Birmingham, UK
Prof. Robert Wilson	University of Florida, Gainesville, USA
Dr. Marek Wolf	Astronomical Institute, Faculty of Mathematics and Physics, Charles University, Czech Republic
Dr. Taras Yakobchuk	Main Astronomical Observatory of the National Academy of Sciences, Ukraine
Dr. Kadri Yakut	University of Ege, Turkey
Ms. Olga Zakhochay	Main Astronomical Observatory, National Academy of Sciences, Ukraine
Mr. Bartlomiej Zakrzewski	Mt. Suhora Observatory, Cracow Pedagogical University, Poland
Dr. Petr Zasche	Astronomical Institute, Faculty of Mathematics and Physics, Charles University Prague, Czech Republic
Dr. Miloslav Zejda	Department of Theoretical Physics and Astrophysics, Masaryk University, Brno, Czech Republic
Mgr. Pawel Zielinski	Torun Centre for Astronomy of the Nicolaus Copernicus University, Poland
Dr. Jozef Ziznovsky	Astronomical Institute, Slovak Academy of Sciences, Tatranska Lomnica, Slovak Republic
Prof. Staszek Zola	Astronomical Observatory, Jagiellonian University, Poland
Prof. Shay Zucker	Tel Aviv University, Israel
Dr. Juraj Zverko	Astronomical Institute, Slovak Academy of Sciences, Slovakia
<b>Accompanying Astronomers</b>	

Mr. Arkadiusz Hypki	N. Copernicus Astronomical Center of the Polish Academy of Sciences
Ms. Eun-Jeong Kim	Korea Astronomy and Space Science Institute
Ms. Jeong Eun Lee	Korea Astronomy and Space Science Institute
Dr. Martin Netopil	University of Vienna
DR. Monika Rode-Paunzen	Institute for Astronomy, University Vienna
Ms. Tatiana Tsvetkova	Institute of Astronomy Russian Academy of Sciences

## **Scientific Highlights of IAU Symposium 282**

### ***From Interacting Binaries to Exoplanets: Essential Modeling Tools***

IAU Symposium 282 entitled “From Interacting Binaries to Exoplanets: Essential Modeling Tools” was organized to bring the exoplanet and binary star communities together to discuss the many techniques that are already being shared, and that may possibly be shared in the future. More specifically, the goal was to demonstrate the extent to which current computer programs are effective in modeling observations of interacting binary stars, brown dwarfs, and exoplanets; to identify ways to improve these codes by incorporating more detailed and realistic physics, while maximizing computer capacity; and to examine how to utilize active and proposed survey projects like Kepler, LSST, and Gaia to obtain data of the highest quality that can be modeled to extract optimal physical parameters, specifically to improve our understanding of the physics. The acceleration of discoveries of brown dwarfs and exoplanets and the rapid influx of very precise light curves from programs like CoRoT and Kepler provide additional stimuli for improving our modeling techniques. In summary, this conference focused on the tools (detection, imaging techniques, modeling codes, computational power) as they are applied to interacting binaries, brown dwarfs, and exoplanets.

The main scientific highlight of the conference was that this goal was fully achieved. Consequently, most participants of the conference characterized it as extremely valuable and highly educational. There were 46 main lectures in addition to the opening lecture and two summary lectures, plus 57 three-minute mini-talks and 121 posters. Thirty-one countries were represented at the meeting. Also, 26% of the main speakers and 40% of the session chairs were female.

The conference was organized into eight scientific topics, complemented by an opening and a closing session. The scientific highlights of the individual sessions were:

#### **Opening Lecture**

This lecture reviewed the modeling tools as well as several open problems in the field. As a result, an IAU Resolution will be drafted to adopt updated astrophysical parameters and constants to improve the accuracy of fundamental parameters. These include the use of  $GM(\text{Sun})$  since this product is more accurate than the product of the separate quantities.

#### **Multiwavelength Photometry and Spectroscopy of Interacting Binaries**

Several excellent review talks were presented about existing and future ground-based and space-based observational instruments devoted to a study of close binaries, with an overview of observational techniques and results. As a connection to exoplanet studies, one talk was devoted to the impact of CoRoT and Kepler on the close binary research. To provide a perspective for a future research, an extremely interesting talk was presented on planned Gaia and LSST missions.

#### **Observations and Analysis of Exoplanets and Brown Dwarfs**

The session was opened by Didier Queloz, a co-discoverer of the first exoplanet orbiting a solar-type star. He summarized the present status of exoplanet search with an emphasis on the radial velocity techniques, and outlined the expected development of the field in the near future. The remaining talks concentrated both on exoplanets and brown dwarfs, emphasizing mostly the transiting planets observed by CoRoT and Kepler. There was also a very interesting talk which specifically described brown dwarfs in binary systems.



## **Imaging Techniques for Binary Stars, Brown Dwarfs, and Exoplanets**

The highlights included several excellent reviews covering different topics of imaging: interferometry, Doppler tomography, polarimetry, vortex coronagraphy, nulling interferometry, adaptive optics, and direct imaging. A collection of talks on essentially all possible detection techniques was highly appreciated by the audience because it enabled the researchers to evaluate advantages and drawbacks of the individual techniques.

## **Model Atmospheres of Stars, Interacting Binaries, Disks, Exoplanets, and Brown Dwarfs**

This session was a collection of review talks devoted to modeling tools for the individual components of the close binary or exoplanetary systems - individual stars, planets, and accompanied disk-like structures. The talks summarized most of the currently used model atmospheres codes for computing LTE as well as non-LTE model atmospheres, model atmospheres of exoplanets, extended atmospheres with stellar winds, and 3-dimensional hydrodynamic simulations of stellar atmospheres. Several interesting new results were presented, for instance a possible use of accurately determined limb darkening coefficients for constraining basic stellar parameters.

## **Synthetic Light Curves, Velocity Curves, Spectra of Binary Stars, and Spectra of Binaries with Accretion Structures**

The new variants of the classical methods and programs for solving the light curves were discussed in this session, as well as the codes that aim at computing the spectrum of a complex close binary system by modeling in detail both stars and the circumstellar accretion structures around them. One of the main highlights was a presentation and statistical survey of a large number of the close binaries discovered by the Kepler mission.

## **Techniques for Analysis of Spectra and Light Curves**

The highlights of this session were two talks about two independent methods of spectral disentangling of the components of the binary system and their possible extensions to exoplanetary spectra. Other highlights included a talk on the history of the Rossiter-McLaughlin Effect followed by applications of the technique to transiting planets and low mass eclipsing binaries. In fact, this method represents the closest methodological connection between close binary and exoplanetary research. The effect was used earlier to identify critical properties of close binary systems, and it is now providing an analogously rich source of information in the case of exoplanets.

## **Formation and Evolution of Binary Stars, Brown Dwarfs, and Planets**

This session presented several excellent reviews on stellar evolution of the components of a close binary system, as well as dynamical models of formation and evolution of exoplanets. The highlights were a discussion and summary of non-conservative effects in the evolution of binaries, and a talk synthesizing simultaneous modeling of atmospheres and the global evolution of exoplanets.

## **Hydrodynamic Simulations of Exoplanets and Mass Transfer in Interacting Binaries**

The session dealt with close binary and exoplanet dynamics, including 3-dimensional hydrodynamic simulations of the atmospheres of these objects, and the mass transfer between them. The highlights were several simulations that showed the ever-increasing power of current

numerical simulations to provide a detailed picture of mass transfer in the case of young binaries with low mass companions, common envelope binaries, and how magnetic fields influence cataclysmic variables and polars. One simulation also considered the meteorology of exoplanet atmospheres via models of global atmospheric circulations and transport of energy from the day to the night side for close-in giant exoplanets.

### **Summary Lectures**

There were two summarizing talks, one on observational techniques, and the other on the theoretical techniques. The latter talk, besides summarizing recent progress, concentrated on a detailed discussion of open problems in the theory and challenges for the future.

### **Panel Discussions**

Panel Discussions were held at the end of each day to summarize the lectures and to make proposals for enhancements to current techniques. Twelve influential astronomers who have contributed to the development of important modeling tools or who have provided insightful reviews of these developments were invited to participate in the symposium as distinguished panelists: France Allard, Alan Batten, Edwin Budding, Edward Devinnay, Peter Eggleton, Artie Hatzes, Ivan Hubeny, Wilhelm Kley, Helmut Lammer, Albert Linnell, Virginia Trimble, and Robert E. Wilson. On the first day, they discussed the historical boundaries between stars, stellar remnants, brown dwarfs, and planets based on their masses, energy production processes, and evolutionary stages. It was an opportunity to re-examine these objects beyond the established ideology. On subsequent days, there were lively discussions of various topics presented during the day, with the enthusiastic participation of the audience.

### **Education and Public Outreach Event in Poprad**

The conference was advertised to the public on the TV radio, and in the newspapers. The public was specifically invited to attend a popular talk by Ivan Hubeny on “Detecting and Studying Extrasolar Planets,” in the Czech language (which is very close to the native Slovak language). The presentation was given in the Town Hall in the nearby city of Poprad, and it was well received by the public. Thirty-seven people attended the lecture and many of them asked questions.

### **Commemoration of the 110<sup>th</sup> Anniversary of the Birth of Dr. Antonín Bečvář**

An exhibition of several posters was prepared by Dr. Ladislav Hric to commemorate the 110<sup>th</sup> anniversary of the birth of Dr. Antonín Bečvář, founder of the Skalnaté Pleso Observatory and author of several famous atlases and catalogues: Atlas Coeli, Atlas Borealis, Atlas Eclipticalis and Atlas Australis which were used nightly by astronomers around the world for almost half a century. The posters were displayed in the main conference lecture hall during the conference.



## POST MEETING REPORT FORM

for meetings other than Joint Discussions and Special Sessions

Deadline for Submission: within 1 month after the meeting

**the following information should be sent  
to the IAU Assistant General Secretary**

The following documents should be attached:

- i Final Scientific Program
- ii List of participants
- iii List of recipients of IAU Grants, including amount and country
- iv Receipts signed by the recipients of IAU Grants (This does not apply to Scientific Meetings held during General Assemblies)
- v Brief report (text.txt file or word.doc) to the Executive Committee on the scientific highlights of the meeting (1-2 pages)

1. Meeting Number: IAUS 283

2. Meeting Title: Planetary Nebulae: An Eye to the Future

3. Coordinating Division: VI

4. Dedication of meeting (if any): No

5. Location (city, country): Puerto de la Cruz, Tenerife, Spain.

6. Dates of meeting: 25-29 July, 2011

7. Number of participants: 157

8. List of represented countries (28):  
11 Australia, 3 Austria, 7 Belgium, 9 Brazil, 1 Canada, 2 Chile, 3 China, 1 Estonia, 1 Francia, 19 Germany, 1 Greece, 5 Hong Kong, 2 India, 1 Israel, 4 Italy, 3 Japan, 2 Latvia, 21 Mexico, 1 Netherlands, 3 Poland, 1 Puerto Rico, 2 Russia, 1 Serbia, 1 South Africa, 23 Spain, 1 Switzerland, 7 UK, 21 USA

9. Report submitted by: Dr. Arturo Manchado Torres

10. Date and place: La Laguna, 25 October, 2011

11. Signature of SOC Chairperson: Dr. Arturo Manchado (co-chair)



# POST MEETING REPORT

## IAU Symposium 283 "Planetary Nebulae: An Eye to the Future" Puerto de la Cruz, Tenerife, Spain, July 25-29, 2011 by Arturo Manchado & Letizia Stanghellini

### SCIENTIFIC PROGRAMME

#### Sunday, 24<sup>th</sup>

18:00 - 20:30 *Welcome Cocktail*  
17:00 - 21:00 Registration

#### Monday, 25<sup>th</sup>

08:00 - 09:00 Registration  
09:00 - 09:15 Welcome address (Arturo Manchado)

#### Session 1: New Results from Observations

Chair: Silvia Torres-Peimbert

09:15 - 09:50 R S Kwok Historical overview of Planetary Nebulae Research.  
09:50 - 10:25 R Q Parker The Past, Present and Future of Planetary Nebulae Surveys in our Galaxy.  
10:25 - 10:50 C R L M Corradi A wealth of new planetary nebulae from the IPHAS survey.  
10:50 - 11:25 *Coffee-break & poster viewing*  
11:25 - 12:00 R Y-H Chu Spitzer Observations of Planetary Nebulae.  
12:00 - 12:25 C L Stanghellini Spitzer IRS spectra of compact Galactic planetary nebulae: the link between dust, early evolution, and metallicity.  
12:25 - 13:00 R P García-Lario Early Herschel results.  
13:00 - 15:00 *Lunch break & poster viewing*

Chair: Ronald Weinberger

15:00 - 15:25 C P van Hoof Herschel observations of PNe in the MESS key program.  
15:25 - 16:00 R L Bianchi New results from the UV.  
16:00 - 16:30 *Coffee-break & poster viewing*  
16:30 - 17:05 R B. Balick How Hubble Changed Research in Planetary Nebulae.  
17:05 - 17:30 C E Lagadec A mid-infrared imaging survey of post-AGB stars.  
17:30 - 17:55 C A López The SPM Kinematic Catalogue of Planetary Nebulae.  
17:55 - 18:20 C R. Rubin SOFIA Observations of the Planetary Nebula NGC 7009.

#### Tuesday, 26<sup>th</sup>

#### Session 2: The Stellar Evolution Connection

2a: Through the AGB and Beyond

Chair: Katrina Exter

09:00 - 09:35 R L Willson Mass loss on the AGB and Beyond.  
09:35 - 10:00 C M Matsuura Observational study of mass loss from AGB stars and beyond.

10:00 - 10:25	C	A Manchado	Morphological classification of post-AGB stars.
10:25 - 10:55	<i>Coffee-break &amp; poster viewing</i>		
10:55 - 11:30	R	P Marigo	AGB evolution: new theoretical results.
11:30 - 12:05	R	R Izzard	Common envelopes: the binary route to Planetary Nebulae?
12:05 - 12:30	C	A Riera	Shaping proto-Planetary Nebulae by binary systems.
12:30 - 12:55	C	B Miszalski	Ongoing surveys for close binary central stars and wider implications.
12:55 - 14:55	<i>Lunch break &amp; poster viewing</i>		
14:55 - 15:20	C	M Moe	Population Synthesis of Galactic PN from Binaries.
15:20 - 15:45	C	S Bright	Observing compact disks inside PPNe with the VLTI.
15:45 - 16:15	<i>Coffee-break &amp; poster viewing</i>		

## 2b: Aspects of the PN Phase

Chair: Richard Henry

16:15 - 16:50	R	K B Kwitter	Cosmic recycling.
16:50 - 17:15	C	A Karakas	Heavy elements in planetary nebulae: A theorist's gold mine.
17:15 - 17:50	R	X. Liu	Atomic processes in photoionized gaseous nebulae.
17:50 - 18:05	R	V Luridiana	Report on the workshop "Uncertainties in Atomic Data and How they Propagate in Chemical Abundances.
18:05 - 18:30	C	D Gonçalves	When Shape Matters: correcting the ICFs to derive the chemical abundances of bipolar and elliptical PNe.

## Wednesday, 27<sup>th</sup>

### Session 2: The Stellar Evolution Connection (cont.)

#### 2b: Aspects of the PN Phase (cont.)

Chair: Detlef Schönberner

09:00 - 09:35	R	A García-Hernández	Molecular processes from the AGB to the PN stage.
09:35 - 10:10	R	R Shaw	Shape, Structure, and Morphology in Planetary Nebulae.
10:10 - 10:35	C	A Frank	Wind Capture Accretion Disks and Magnetic Towers in pPN.
10:35 - 10:55	<i>Coffee-break &amp; poster viewing</i>		
10:55 - 11:30	R	W Steffen	Dynamical modeling and the interactions with the ISM.
11:30 - 11:55	C	A Amiri	Magnetic Fields and Developing Asymmetries in Circumstellar Masers of evolved stars.
11:55 - 12:20	C	W Vlemmings	Magnetic fields during the evolution towards Planetary Nebulae.
12:20 - 12:45	C	R Sahai	Understanding the Immediate Progenitors of Planetary Nebulae.
12:45 - 19:00	<i>Dolphin watching trip</i>		
15:00 - 20:00	<i>Excursion to the Teide National Park</i>		

## Thursday, 28<sup>th</sup>

### Session 2: The Stellar Evolution Connection (cont.)

#### 2c: Aspects of the Central Stars (cont.)

Chair: Albert Zijlstra

09:00 - 09:25	C	S-N Chong	Multipolar Planetary Nebulae: Not as Geometrically
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09:25 - 09:50	C	P Huggins	Diversified as Thought.
09:50 - 10:15	C	D Frew	Jet Power in Planetary Nebulae: Theory vs. Observation.
10:15 - 10:45	R	M Peimbert	Are planetary nebulae derived from multiple evolutionary scenarios?
10:45 - 11:15			Poster Summary.
11:15 - 11:50	R	K Werner	Poster Summary.
11:50 - 12:25	R	M Guerrero	<i>Coffee-break &amp; poster viewing</i>
12:25 - 12:50	C	M Ziegler	The white dwarf connection.
12:50 - 13:10			Observations of central stars and their winds from X-ray observations.
13:10 - 15:10			(F)UV Spectroscopy of 15 Extremely Hot Central Stars of Planetary Nebulae.
15:10 - 15:35	C	M Steffen	<i>Group Photograph</i>
15:35 - 16:10	R	E Villaver	<i>Lunch break &amp; poster viewing</i>
16:10 - 16:40	R	G van de Steene	Modeling the diffuse X-ray emission of Planetary Nebulae with different chemical composition.
16:40 - 16:55			Planets, Evolved Stars, and How they might influence each other.
			Poster Summary.
			<i>Coffee-break &amp; poster viewing</i>

### Session 3: The Cosmic Population of Galactic and Extragalactic PNe

Chair: Walter Maciel

16:55 - 17:30	R	W Reid	PNe in the Magellanic Clouds and other Local Group galaxies.
17:30 - 17:55	C	H van Winckel	Post-AGB stars of the LMC and SMC.
17:55 - 18:20	C	G Stasinska	Ionization of galaxies by their planetary nebulae.
20:00 - 23:00			Closing Dinner at "La Finca Zamora"

## Friday, 29<sup>th</sup>

### Session 3: The Cosmic Population of Galactic and Extragalactic PNe

(cont.)

Chair: Roberto Méndez

09:00 - 09:35	R	M Richer	PN populations and kinematics.
09:35 - 10:10	R	L Magrini	Constraining the chemical evolution of the Local Group Galaxies.
10:10 - 10:35	C	L Guzmán-Ramírez	Carbon chemistry in Galactic Bulge Planetary Nebulae.
10:35 - 11:00	C	M Peña	Planetary nebulae in NGC300: their chemical abundances and the abundance gradient in this galaxy.
11:00 - 11:20			<i>Coffee-break &amp; poster viewing</i>
11:20 - 11:55	R	M Arnaboldi	PN populations in external galaxies.
11:55 - 12:20	C	L Girardi	M31 planetary nebulae as seen by PHAT.
12:20 - 12:45	C	J R Walsh	NGC 5128 - a nearby laboratory for PNe in a giant early-type galaxy.
12:45 - 13:10	C	M Sarzi	The Planetary Nebulae Population in the Central Regions of M32: the SAURON view.
13:10 - 15:00			<i>Lunch break &amp; poster viewing</i>

### Session 4: Future Endeavours in the Field

Chair: Letizia Stanghellini

15:00 - 15:35	R H Käufl	The Frontier of Ground-Based Observations.
15:35 - 16:10	R M Barlow	The impact of future space observatories on PN research.
16:10 - 17:00	<i>General discussion</i>	

## LIST OF PARTICIPANTS

NAME	INSTITUTION	GENDER
Akras, Stavros	IA-UNAM	M
Aller Egea, Alba	Universidad de Vigo	F
Amiri, Nikta	Leiden Observatory/JIVE	F
Arkay, Bernardino	Universidad A Coruña	M
Arnaboldi, Magda	ESO	F
Balick, Bruce	University of Washington	M
Barlow, Michael	UCL	M
Bianchi, Luciana	Johns Hopkins University	F
Bilikova, Jana	University of Illinois	F
Blanco Cárdenas, Mónica	IAA-CSIC	F
Boffin, Henri	ESO	M
Boissay, Rozenn	Macquarie University	F
Bojicic, Ivan	Macquarie University	M
Boumis, Panayotis	National Observatory of Athens	M
Bright, Stacey	Macquarie University	F
Buntain, Joelene	Monash University	F
Cataldo, Franco	Osservatorio Astrofisico di Catania	M
Cavichia, Oscar	University of Sao Paulo	M
Cerrigone, Luciano	MPI fuer Radioastronomie	M
Chinnathambi, Muthumariappan	Vainu Bappu Observatory	M
Choi, Yoon Kyung	MPIfR	F
Chong, Sze-Ning	Kagoshima University	F
Chu, You-Hua	University of Illinois	F
Clark, David	IA-UNAM	M
Corradi, Romano	IAC	M
Costa, Roberto	IAG/USP	M
Dalnodar, Silvia	Astro & Particle Physics Innsbruck	F
Danehkar, Ashkbiz	Macquarie University	M
Delgado Inglada, Gloria	INAOE	F
Douchin, Dimitri	Macquarie University	M
Dufour, Reginald	Rice University	M
Escalante, Vladimir	Centro de Radioastronomía y Astrofísica-UNAM	M
Esteban, César	IAC	M
Exter, Katrina	Instituut voor Sterrenkunde, KULeuven	F
Falceta-Gonçalves, Diego	Universidade de Sao Paulo	M
Fang, Xuan	Peking University	M
Filipovic, Miroslav	University of Western Sydney	M
Frank, Adam	University of Rochester	M
Freimanis, Juris	Ventspils University College	M
Frew, David	Macquarie University	M
García Rojas, Jorge	IAC	M
García-Díaz, María Teresa	IA-UNAM	F
García-Hernández, Anibal	IAC	M
García-Lario, Pedro	European Space Astronomy Centre/ESA	M
Gielen, Clío	Instituut voor Sterrenkunde, KULeuven	F
Girardi, Leo	Osservatorio Astronomico di Padova	M
Gómez, Yolanda	Centro de Radioastronomía y Astrofísica-UNAM	F
Gonçalves, Denise R.	UFRJ - Observatorio do Valongo	F
Gorny, Slawomir	N. Copernicus Astronomical Center	M
Guerrero, Martín A.	IAA-CSIC	M

Guillen, Pedro Francisco	IA-UNAM	M
Gúzman-Ramirez, Lizette	JBCA, University of Manchester	F
Hajduk, Marcin	N. Copernicus Astronomical Center	M
Harrington , J. Patrick	University of Maryland	M
Henry, Richard	University of Oklahoma	M
Hsia, Chih-Hao	University of Hong Kong	M
Huggins, Patrick	New York University	M
Imai, Hiroshi	Kagoshima University	M
Izzard, Robert	University of Bonn	M
Jacob, Ralf	Leibniz Institute for Astrophysics	M
Jones, David	ESO	M
Karakas, Amanda	Mt Stromlo Observatory, ANU	F
Käufel, Hans Ulrich	European Southern Observatory	M
Keller, Graziela	Universidade de Sao Paulo	F
Kholtygin, Alexander	Saint-Petersburg University	M
Kimeswenger, Stefan	Astro & Particle Physics Innsbruck	M
Koning, Nico	University of Calgary	M
Kronberger, Matthias	Deepskyhunters Collaboration	M
Kwitter, Karen	Williams College	F
Kwok, Sun	The University of Hong Kong	M
Lagadec, Eric	ESO, Garching	M
Leal-Ferreira, Marcelo L.	Argelander-Institut fuer Astronomie	M
Lewis, Murray	N/A	M
Liimets, Tiina	Tartu Observatory	F
Liu, Xiaowei	The Kavli Institute for A&A at Peking Univ.	M
López García, José Alberto	IA-UNAM	M
Luridiana, Valentina	IAC	F
Maciel, Walter	University of Sao Paulo	M
Magrini, Laura	INAF Osservatorio Astrofisico di Arcetri	F
Mahsereci, Maren	Institute for A&A Tuebingen	F
Mampaso, Antonio	IAC	M
Manchado, Arturo	IAC	M
Manso, Rafael	IAC	M
Manteiga, Minia	Universidad de A Coruña	F
Marigo, Paola	Università di Padova	F
Matsuura, Mikako	University College London	F
McNabb, Ian	Kavli Institute of A&A at Peking Univ.	M
Méndez, Roberto	IfA, University of Hawaii	M
Milingo, Jackie	Gettysburg College	F
Miranda, Luis Felipe	CSIC - Universidade de Vigo	M
Miszalski, Brent	SAAO	M
Moe, Max	Harvard University	M
Monteiro, Hektor	Universidade Federal de Itajubá	M
Montez, Rodolfo	Rochester Institute of Technology	M
Morisset, Christophe	IA-UNAM & IAC	M
Nakashima, Jun-ichi	University of Hong Kong	M
Navarro, Silvana	IAM, Universidad de Guadalajara	F
Neelamraju, Kameswara Rao	Indian Institute of Astrophysics	M
Núñez, Manuel	IAC	M
Ohsawa, Ryou	University of Tokyo	M
Olguin, Lorenzo	Universidad de Sonora	M
Ortiz, Roberto	Universidade de Sao Paulo	M
Parker, Quentin	Macquarie University/AAO	M
Peimbert, Antonio	IA-UNAM	M
Peimbert, Manuel	IA-UNAM	M
Peña, Miriam	IA-UNAM	F
Pereyra, Margarita	IA-UNAM	F
Pérez Sánchez, Andrés Felipe	AlfA	M
Ramos Larios, Gerardo	Instituto de Astronomía y Meteorología	M



Reid, Warren	Macquarie University	M
Reindl, Nicole	Institut for A&A Tuebingen	F
Richer, Michael	IA-UNAM	M
Riera, Angels	Universitat Politècnica de Catalunya	F
Rizzo, Ricardo	Centro de Astrobiologia	M
Rodrigues, Thaise	IAG/USP	F
Rodríguez, Mónica	INAOE	F
Rubin, Robert	NASA Ames Research Center	M
Sabin, Laurence	IA-UNAM	F
Sahai, Raghvendra	Jet Propulsion Laboratory, Caltech	M
Sandin, Christer	Leibniz-Institut für Astrophysik Potsdam (AIP)	M
Sankrit, Ravi	SOFIA Science Center	M
Santander-García, Miguel	Observatorio Astronómico de Madrid	M
Sarzi, Marc	University of Hertfordshire	M
Schönberner, Detlef	Leibniz-Institut für Astrophysik Potsdam (AIP)	M
Sharova, Olga	NNGASU, Nizhny Novgorod	F
Shaw, Richard	NOAO	M
Sorensen, Peter	Nordic Optical Telescope	M
Stanghellini, Letizia	NOAO	F
Stasinska, Grazyna	LUTH, Observatoire de Paris-Meudon	F
Steffen, Matthias	Leiniz Institute for Astrophysics Potsdam	M
Steffen, Wolfgang	IA-UNAM	M
Sterling, Nicholas	Michigan State University	M
Szczerba, Ryszard	N. Copernicus Astronomical Center	M
Szyszk, Cezary	University of Manchester	M
Todt, Helge	University of Potsdam	M
Torres-Peimbert, Silvia	UNAM	F
Tuchman, Yitzchak	Hebrew University Jerusalem Israel	M
Tyndall, Amy	University of Manchester / ING	F
van de Steene, Griet	Royal Observatory of Belgium	F
van Hoof, Peter	Royal Observatory of Belgium	M
van Marle, Allard Jan	K.U. Leuven	M
van Winckel, Hans	Instituut voor Sterrenkunde	M
Verbena, Juan Luis	Universidad de Guanajuato	M
Verhoelst, Tijn	Instituut voor Sterrenkunde, KULeuven	M
Villaver, Eva	Universidad Autonoma de Madrid	F
Vlemmings, Wouter	Argelander-Institut für Astronomie	M
Vukotic, Branislav	Astronomical Observatory Belgrade	M
Walsh, Jeremy	European Southern Observatory	M
Weinberger, Ronald	Institute of Astro & Particle Physics	M
Werner, Klaus	University of Tuebingen	M
Wesson, Roger	UCL	M
Willson, Lee Anne	Iowa State University	F
Yung, Bosco	The University of Hong Kong	M
Zacs, Laimons	University of Latvia	M
Zhang, Yong	The University of Hong Kong	M
Ziegler, Marc	University of Tuebingen	M
Zijlstra, Albert	University of Manchester	M

## RECIPIENTS OF IAU GRANTS, stating amount, country and gender

FAMILY NAME	FIRST NAME	GRANT	NATIONALITY	GENDER
Akras	Stavros	288	Greek	M
Aller Egea	Alba	288	Spanish	F
Bright	Stacey	288	American	F
Buntain	Joelene	93	Australian	F
Cavichia	Oscar	288	Brazilian	M

Chinnathambi	Muthumariappan	1.475	India	M
Chong	Sze-Ning	2.515	Chinese	F
Danehkar	Ashkbiz	525	Iranian	M
Douchin	Dimitri	288	French	M
Falceta-Gonçalves	Diego	93	Brazilian	M
Gonçalves	Denise R.	460	Brazilian	F
Guillen	Pedro Fco	288	Mexican	M
Gúzman-Ramírez	Lizette	288	Mexican	F
Hajduk	Marcin	288	Polish	M
Imai	Hiroshi	93	Japanese	M
Jacob	Ralf	288	German	M
Karakas	Amanda	288	Australian	F
Keller Rodrigues	Graziela	1.400	Brazilian	F
Kholtygin	Alexander	288	Russian	M
Leal-Ferreira	Marcelo L.	288	Brazilian	M
Mahsereci	Maren	680	German	F
Miszalski	Brent	288	Australian	M
Monteiro	Hektor	288	Brazilian	M
Navarro	Silvana	93	Mexicana	F
Neelamraju	Kameswara Rao	1.550	Indian	M
Ohsawa	Ryou	288	Japan	M
Pérez Sánchez	Andrés Felipe	288	Colombian	M
Ramos Larios	Gerardo	93	Mexican	M
Reindl	Nicole	288	German	F
Rodrigues	Thaise	288	Brazilian	F
Rubin	Robert	93	American	M
Sabin	Laurence	255	French	F
Sharova	Olga	1.115	Russian	F
Szyszk	Cezary	288	Polish	M
Tyndall	Amy	288	British	F
Verbena	Juan Luis	288	Mexican	M
Vukotic	Branislav	790	Serbian	M
Yung	Bosco	1527	British	M

## SCIENTIFIC HIGHLIGHTS OF THE SYMPOSIUM

Planetary Nebulae (PNe) play a key role in stellar evolution; an important fraction of stellar matter in the Universe (stars in the approximate range of 1-8  $M_{\odot}$ , low- and intermediate-mass stars, or LIMS), go through the AGB and PN phases in their lifetime, thus understanding their working is essential. Observationally, most known PNe are the progeny of the lower mass end, since the dynamical PN phase of the PNe with massive progenitors is intrinsically very short and thus less populated; the high-mass end of the LIMS is observed at early stages, when they appear as embedded AGB stars. PNe are major contributors to the chemical enrichment of the galaxies, especially where nitrogen and carbon are concerned. PNe are multi-wavelength laboratories for the understanding of atomic, molecular, dust, and plasma processes in different astrophysical environments. The means, by which the wonderfully diverse morphologies of PN originate and evolve, including hydrodynamical shaping mechanisms and the role of binarity, magnetic fields and rotation, make them essential to constrain hydrodynamics models and advanced stellar evolutionary calculations. PNe influence the interstellar media of galaxies, enriching them chemically; and they are a tool for studying the dynamics and mass distributions of galaxies and the intergalactic media of clusters of galaxies.

The PN community has enjoyed an ongoing history of successful IAU symposia, beginning with IAU Symp. 34 in Tatranska Lomnica, Czechoslovakia in 1967, followed by IAU Symp. 76 in Ithaca, N.Y., U.S.A. in 1977, IAU Symp. 103 in London, England in 1982, IAU Symp. 131 in Mexico City, Mexico in 1987, IAU Symp. 155 in Innsbruck, Austria in 1992, IAU Symp. 180 in Groningen,

Holland in 1996, IAU Symp. 209 in Canberra, Australia in 2001, and IAU Symp. 234 in Hawaii, USA in 2006. At a meeting of the PN Working Group at La Palma in June 2007, in response to an invitation by Dr. A. Manchado of the Instituto de Astrofísica de Canarias, the working group members unanimously voted in favour of Tenerife, Spain, as the site of the next IAU Symposium on PN. This recognizes the significant contributions made by Spanish astronomers to the field of PN research. In fact, La Palma, Spain, has become one of the most important astronomical observatory sites in the world, with the inauguration of the GTC 10.4 meter telescope...

In May 2011, the IAU Commissions and Divisions endorsed and agreed to sponsor the IAU Symposium 283, which was also approved by the IAU Executive Committee. From the start, the SOC established certain criteria regarding invited reviews, with an emphasis on youthful speakers, a balance of gender and geographical provenience, and priority to non SOC members. After the April 3rd deadline for the abstracts, the SOC selected the 30 oral presentations. A large number of posters were also presented at the Symposium, over several sessions, providing the attendants with many promising topics to discuss during the meeting.

IAU Symposium 283 was held from July 25-29 2011 at Puerto de la Cruz on Tenerife in the Canary Islands, Spain. One hundred and fifty-seven participants from 26 countries from the five continents interacted and discussed the many different aspects and facets of the planetary nebulae field. The meeting included 24 invited review papers (30+5 minutes), 30 oral contributions (20+5 minutes) and 139 poster presentations.

The Local Organising Committee, consisting of Judith Araoz, Eva Bejarano, Romano Corradi, Anibal Garcia-Hernandez, Valentina Luridiana, Arturo Manchado (Chair), Christophe Morisset and Eva Villaver provided a very efficient operation that was warmly appreciated by all participants.

The broad meeting themes included surveys of PNe; aspects of the PNe phase; the central stars; the population of galactic, extragalactic, and intra-cluster PNe; and future endeavours in the field.

Some of the most significant highlights of this meeting were:

- The results from PHAS: The INT/WFC Photometric H $\alpha$  Survey of the Northern Galactic Plane was completed, allowing the discovery of 155 new PNe.
- New results from the HERSCHEL satellite were presented; e.g., new large detached shells around AGB stars formed by the interaction of the AGB mass loss with the ISM and the discovery of water vapor in a C-rich AGB star.
- Large carbon molecules, the so-called fullerenes (C60 and C70), were detected around PNe in the Milky Way and in nearby galaxies such as the Magellanic Clouds. These fullerenes, the biggest molecules known in space, have been detected accompanied by large concentrations of hydrogen, contradicting the actual theories and the laboratory experiments, which show that fullerene formation is strongly inhibited by hydrogen. It turns out that fullerenes are much more common and abundant in the Universe than initially thought, with important implications to circumstellar/interstellar Chemistry and Physics. In addition, graphene (planar C24) has been detected for the first time in some PNe with fullerenes.
- The relationship between uncertainties in atomic data and the resulting uncertainty in derived abundances was discussed. Such relationships can be articulated in a few specific questions, such as: Do uncertainties in atomic data matter in chemical abundance calculations? How large are they? Why they are not usually specified in the papers that describe them? Can they be estimated somehow? How can I decide between two conflicting data sets? And, most important of all, how will the choice affect the final results?
- A "Kinematic Catalogue of Galactic Planetary Nebulae" that consists of high resolution (between 6 and 11.5 km s<sup>-1</sup>) spectra of about 600 PN was completed.
- 3-D models of the common envelope phase were presented.
- New results from MC and local group galaxies were presented, allowing the faint end of the luminosity function to be investigated.

We were fortunate to receive significant financial contributions from the Spanish Ministry of Science and Innovation (MICINN), the Island Council (Cabildo Insular) of Tenerife and the Instituto de Astrofísica de Canarias (IAC), all of which made this meeting possible.

## **SOC members:**

Mike Barlow (UK)  
Walter Maciel (Brazil)  
Romano Corradi (Spain)  
Arturo Manchado (Spain, co-Chair)  
You- Hua Chu (USA)  
Roberto Mendez (USA)  
Shuji Deguchi (Japan)  
Quentin Parker (Australia)  
Adam Frank (USA)  
Letizia Stanghellini (USA, co-Chair)  
George Jacoby (USA)  
Detlef Schonberner (Germany)  
Sun Kwok (China)  
Albert Zijlstra (UK)  
Alberto López (México)

## **WOMEN IN ASTRONOMY STATISTICS**

### **Meeting:**

Meeting Number: IAUS 2183  
Meeting Title: Planetary Nebulae: An Eye to the Future  
City: Puerto de la Cruz, Tenerife, Spain  
Start date: 25th July, 2011  
End date: 29<sup>th</sup> July, 2011

### **SOC Chair:**

SOC Chair Name: Arturo Manchado and Letizia Stanghellini  
SOC Chair E-mail: [amt@iac.es](mailto:amt@iac.es)

### **Number of registered participants:**

Men (registered participants): 110  
Women (registered participants): 47

### **Number of invited speakers:**

Men (invited speakers): 15  
Women (invited speakers): 9

### **Number of contributing speakers:**

Men (contributing speakers): 19  
Women (contributing speakers): 11

### **Number of poster presentations:**

Men (poster presentations): 96  
Women (poster presentations): 43

### **Number of SOC members:**

Men (SOC members): 13  
Women (SOC members): 2

### **Number of LOC members:**

Men (LOC members): 4  
Women (LOC members): 4

### **Number of IAU grant recipients:**

Men (IAU grant recipients): 23  
Women (IAU grant recipients): 15



International Astronomical Union  
Union Astronomique Internationale

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## POST MEETING REPORT FORM

1. **Meeting Number:** 284
2. **Meeting Title:** The spectral energy distribution of galaxies
3. **Coordinating Division:** Division VIII (Galaxies and the Universe)
4. **Dedication of meeting (if any):** None
5. **Location (city, country):** Preston, UK
6. **Dates of meeting:** 5-9 September 2011
7. **Number of participants:** 151
8. **List of represented countries:** Argentina, Armenia, Australia, Belgium, Brazil, Canada, Cyprus, China, Croatia, Denmark, ESO, Finland, France, Germany, Greece, Italy, Japan, Mexico, New Zealand, The Netherlands, Portugal, Russia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, UK, Ukraine, USA, Venezuela
9. **Report submitted by:** Cristina C. Popescu and Richard J. Tuffs
10. **Date and place:** Preston, UK

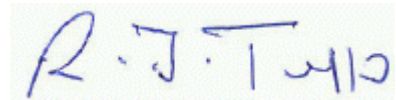
Appendix 1: Scientific Program of IAU Symp. 284

Appendix 2: List of recipients of IAU grants

Appendix 3: Scientific highlights of the meeting

A form for “Women in Astronomy” statistics was submitted to the Chair of “Women in Astronomy EC Working Group”.

**11. Signature of SOC Chairperson:**

A handwritten signature in blue ink that reads "E. Popescu". The signature is fluid and cursive, with a long horizontal stroke at the end.A handwritten signature in blue ink that reads "R. J. T. M. J. O.". The signature is more formal and blocky than the one to its left, with distinct letters and a horizontal line at the end.

# SED2011: The Spectral Energy Distribution of Galaxies

(IAU Symposium 284, 5-9 September 2011, Preston, UK)

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## Programme

### Monday, Sept. 5th

#### Welcome and Introduction

09.00 - 09.10 Gordon Bromage  
Welcome Address

**(Chair: Richard Tuffs)**

09.10 - 09.40 Barry F. Madore  
Introduction: The Reification of Galaxies: Cognitive Astrophysics and the Multiwavelength Inverse Problem

#### Session 1:

##### Population Synthesis

09.40 - 10.20 IR Claus Leitherer  
Population Synthesis

10.20 - 10.40 CT Anne Sansom  
Effects of Non-Solar Abundance Ratios on Star Spectra: Comparison of Observations and Models

10.40 - 11.00 CT Philippe Prugniel  
High Spectral Resolution Models of Stellar Populations Resolved in Detailed Abundances

11.00 - 11.30 Coffee Break in the Poster Area

11.30 - 11.50 CT Daniel Schaerer  
The Importance of Nebular Emission for SED Modelling of Distant Star-forming Galaxies

11.50 - 12.10 CT Ignacio Ferreras  
Beyond Model Fitting SEDs

12.10 - 12.30 CT Sara Heap  
What the UV SED tells us about Unresolved Stellar Populations and Galaxies

12.30 - 12.50 CT Benjamin D. Johnson  
Star Formation History and the SED of Dwarf Galaxies: Insights from Resolved Stars

#### Lunch

12.50 - 14:10 Lunch and Poster Viewing

(Coffee Available from 13:40 in the Poster Area)

#### Session 2:

##### Understanding the Emergent SEDs Of Local Universe Galaxies

**(Chair: Kenny Wood)**

14.10 - 14.40 IT Xander Tielens  
Chemical and Physical Properties of Interstellar Grains

14.40 - 15.20 IR Ralf Siebenmorgen  
Dust Processing of Radiation in Galaxies

#### **Spiral And Dwarf Galaxies**

15.20 - 15.40 CT Ilse De Looze  
A Detailed Energy Balance Study of the Sombrero Galaxy

15.40 - 16.00 CT Brent Groves  
Linking the Stars and Dust in M31

16.00 - 16.30 Coffee Break in the Poster Area

16.30 - 16.50 CT George Bendo  
Investigations of Dust Heating in M81, M83 and NGC 2403 with Herschel and Spitzer

16.50 - 17.10 CT Erin Mentuch  
How Stars Heat and Create the Dust in a Nearby Elliptical and Spiral Galaxy

17.10 - 17.30 CT Oskar Karczewski  
Modelling Blue Compact Dwarf Galaxies with MOCASSIN

17.30 - 17.50 CT Ciska Kemper  
Deconstructing the Spectral Energy Distribution of the Large Magellanic Cloud: Contributions from the Point Sources

**19.00 - 20.30 Welcoming Reception at The Harris Museum**

## **Tuesday, Sept. 6th**

### **Session 2:**

#### **Understanding the Emergent SEDs of Local Universe Galaxies (continued)**

##### **Spiral and dwarf galaxies (continued)**

##### **(Chair: Daniel Schaerer)**

9.00 - 9.30 IT Suzanne Madden  
The Elusive ISM of Dwarf Galaxies: Assessing the Dust and Gas Properties in Low Metallicity Environments

9.30 - 9.50 CT Ute Lisenfeld  
The Dust SED in Dwarf Galaxies: The Case of NGC 4214

9.50 - 10.20 IT Sukanya Chakrabarti  
Spikes in the SED and Ripples in the Outskirts of Galaxies

##### **Starburst Galaxies and AGN**

10.20- 10.40 CT Gregory Snyder  
Modelling Bulge Assembly Through Galaxy Interactions

10.40 - 11.00 CT Lauranne Lanz  
The SEDs of Interacting Galaxies



11.00 - 11.30 Coffee Break

**(Chair: Barry Madore)**

11.30 - 11.50 CT Andreas Efstathiou

A New Model for the Infrared Emission of IRAS F10214+4724

11.50 - 12.10 CT Renee Kraan-Korteweg

The SED of the Nearby HI-massive LIRG HIZOA J0836-43: from the NIR to the Radio Domain

12.10 - 12.50 IR Daniel Wang

Emission Sources of X-rays from Galaxies

12.50 - 13.10 CT Almudena Prieto

Optical-NIR/MIR Spectral Energy Distribution at Parsec Scales of the Nearest AGN

**Lunch**

13.10 - 14.30 Lunch and Poster Viewing

(Coffee Available from 14:00 in the Poster Area)

**(Chair: Ignacio Ferreras)**

14.30 - 14.50 CT Mark Lacy

SEDs of Dust-obscured Quasars selected in the Mid-infrared

**Early-type Galaxies**

14.50 - 15.20 - IT Martin Bureau

Molecular Gas, Dust, and Star Formation in Early-type Galaxies

15.20 - 15.40 CT Hyunjin Jeong

Young Stars in Nearby Early-type Galaxies: SED Fitting based on Ultraviolet (UV) and Optical Imaging

15.40 - 16.00 CT Richard McDermid

Star Formation Histories of Early-Type Galaxies

16.00 - 16.30 Coffee Break in the Poster Area

**(Chair: Patricia Sanchez-Blazquez)**

16.30 - 16.50 CT Hidehiro Kaneda

Dust and PAHs in X-ray Plasma of Elliptical Galaxies

**Multiwavelength Surveys**

16.50 - 17.10 CT Dave L. Clements

Far-IR to Submm SEDs for Local Galaxies: Herschel, Planck and the HRS

17.10 - 17.30 CT Elisabete Da Cunha

A Simple Model to estimate the Dust Content and Star Formation Activity of Galaxies from their observed SEDs

17.30 - 17.50 CT Denis Burgarella

CIGALE: An UV-to-submm SED Fitting Code, Applications from the Local Universe to the Highest Redshift

17.50 - 18.10 CT Veronique Buat

Fitting the full SED (from UV to Far-IR) of Galaxies: New Constraints on Dust Attenuation and Star Formation Determinations, from  $Z=0$  to  $Z=2$

## Wednesday, Sept. 7th

### Session 2:

#### Understanding the Emergent SEDs of Local Universe Galaxies (continued)

Multiwavelength Surveys (continued)

(Chair: Renee Kraan-Korteweg)

9.00 - 9.40 IR Simon Driver

Panchromatic Properties of Galaxies in Wide-field Optical Spectroscopic and Photometric Surveys

9.40 - 10.00 CT Meiert Grootes

Investigating Environmental Dependencies of Gas-Fuelling in GAMA Galaxies

10.00 - 10.20 CT John Moustakas

PRIMUS - The PRISM Multi-object Survey

10.20 - 10.40 CT Viviana Acquaviva

From Fluxes to Physical Properties: SED Fitting with Markov Chain Monte Carlo

10.40 - 11.00 CT Sharon Meidt

The S4G View of Stellar Mass, MIR Dust, and Evolved, Intermediate-age Stars in Nearby Galaxies

11.00 - 11.30 Coffee Break in Poster Area

11.30 - 11.50 CT Steven Bamford

Measuring SEDs for Individual Galaxy Components

11.50 - 12.10 CT Kyuseok Oh

Improved and Quality-Assessed Emission and Absorption Line Measurements in Sloan Digital Sky Survey Galaxies

### Session 3:

#### Star-Formation in Galaxies

12.10 - 12.50 IR Bruce Elmegreen

What Triggers Star-formation in Galaxies?

12.50 - 13.10 CT Hong-Xin Zhang

Variations of the Star Formation Histories and the Stellar Mass of the LITTLE THINGS Dwarf Irregular Galaxies

#### Lunch

13.10 - 14.30 Lunch and Poster Viewing

(Coffee Available from 14:00 in the Poster Area)

### Session 3:

#### Star-Formation in Galaxies

(Chair: Hidehiro Kaneda)

14.30 - 14.50 CT Barry F. Madore

Decoding the Schmidt Law

14.50 - 15.10 CT Yu Gao

The Global Star Formation Law of Galaxies in Terms of Dense Molecular Gas

15.10 - 15.40 IT Francois Boulanger

The Energetics of Turbulent Molecular Gas

15.40 - 16.00 CT Giovanni Natale

The Nature of the Dust Emission in Stephan's Quintet

16.00 - 16.30 Coffee Break in Poster Area

**(Chair: Daniel Wang)**

16.30 - 17.00 IT Chris Martin

"GALEX (Galaxy Evolution Explorer): Tracing Star Formation History using Spectral Energy Distributions

17.00 - 17.30 IT Andrew Hopkins

Multiwavelength Indicators of SFR

17.30 - 18.00 IT Andreas Zezas

Accreting Binaries and Star Formation in Galaxies

18.00 - 18.20 CT Stefano Zibetti

Resolved Optical-infrared SEDs of Galaxies: Universal Relations and their Break-down on Local Scales

## Thursday, Sept. 8th

**Session 4:**

**The Panchromatic View Of The Milky Way**

**(Chair: Francois Boulanger)**

9.00 - 9.20 CT Jiali Zhu

The Dust Temperature and ISRF in Hi-GAL SDP Fields

9.20 - 9.40 CT Kenny Wood

3D Radiation Transfer Modeling of Observations of Dust and Ionized Gas in the Galaxy

9.40 - 10.00 CT Norikazu Mizuno

The CO View of the Milky Way by NANTEN

10.00 - 10.30 IT Brenda Dingus

High Energy Imaging of the Milky Way

10.30 - 10.50 CT T. Porter

Multi-Wavelength View of Cosmic-Ray Induced Diffuse Emissions from the Milky Way and Local Group Galaxies

10.50 - 11.20 Coffee Break in the Poster Area

**(Chair: Andreas Zezas)**

11.20 - 11.40 CT Christoph Deil

The HESS View of the Milky Way in TeV Light

11.40 - 12.10 IT Roland Crocker  
The Galactic Center - A Laboratory for Starburst Galaxies

**Session 5:  
Linking Low and High-Energy Properties Of Galaxies**

12.10 - 12.30 CT Kazufumi Torii  
Dark Gas: A new possible link between Low- and High-Energy Phenomena

12.30 - 13.00 IT Jim Hinton  
High-Energy Emission Mechanisms in Galaxies: Status, Prospects and Multi-wavelength Connections

**Lunch**

13.00 - 14.30 Lunch and Poster Viewing (Coffee Available from 14:00 in the Poster Area)

**Session 5:  
Linking Low and High-Energy properties of Galaxies (continued)**

**(Chair: Steven Serjeant)**

14.30 - 14.50 CT Brian Lacki  
Cosmic Rays and High Energy Emission from Starburst Galaxies

14.50 - 15.10 CT W. Domainko  
Gamma Rays from the Starburst Galaxy NGC 253

15.10 - 15.40 IT Todd Thompson  
The Infrared Radio Correlation

15.40 - 16.00 CT F.S. Tabatabaei  
Resolved Radio-FIR/Submm Correlation in Nearby Galaxies with Herschel

16.00 - 16.30 Coffee Break in the Poster Area

16.30 - 16.50 CT Gustavo Romero  
The Non-thermal Broadband Spectral Energy Distribution of Radio Galaxies

16.50 - 17.10 CT Alberto Dominguez  
An Empirical Approach to the Extragalactic Background Light from AEGIS Galaxy SED-type Fractions

**19:15 Guided Tour at The Houghton Tower and Conference Dinner**

## **Friday, Sept. 9th**

**Session 5:  
Linking Low and High-Energy Properties Of Galaxies (continued)**

**(Chair: David Clements)**

9.00 - 9.30 IT Kalevi Mattila  
Photometric Measures of the Extragalactic Background Light

9.30 - 9.50 CT Yoshiki Matsuoka

Cosmic Optical Background: The View from Pioneer 10/11

9.50 - 10.20 IT Luigi Costamante

Constraints on IR Extragalactic Background Radiation from Veritas and HESS VHE Gamma-ray Absorption Studies

**Session 6:**

**Understanding The Cosmological Evolution Of Emergent SEDs**

10.20 - 11.00 IR Michael Rowan-Robinson

Panchromatic Radiation from Galaxies as a Probe of Galaxy Formation and Evolution

11.00 - 11.30 Coffee Break

11.30 - 11.50 CT T. Takagi

Photometric Study of PAH Emission from Distant Infrared Galaxies

11.50 - 12.20 IT Loretta Dunne

Digging Up the Dirt on Galaxies with Herschel

12.20 - 12.40 CT Stijn Wuyts

Accurate SFRs and the Mode of Star Formation Over 11 Gyr of Lookback Time

12.40 - 13.00 CT Sugata Kaviraj

The Star Formation Histories of Early-type Galaxies: New Insights from the Rest-frame Ultraviolet

**Lunch**

13.00 - 14.10 Lunch

**(Chair: Brad Gibson)**

14.10 - 14.40 IT Martin Meyer

Linking Gas Content and Star-formation Activity over Cosmic Time

14.40 - 15.00 CT Ray Norris

EMU: The Evolutionary Map of the Universe

15.00 - 15.30 IT Steve Serjeant

Multiwavelength Properties of Distant Lensed Galaxies

15.30 - 16.00 IT Asantha Cooray

Multiwavelength Probes of the Epoch of Reionization

16.00 - 16.30 Coffee Break

**(Chair: Gordon Bromage)**

16.30 Conference Summary Jay Gallagher, Gustavo Bruzual and Carol Lonsdale

**Public Talk**

19:00 Don Kurtz

The Beauty of Galaxies: from the Milky Way to the Beginning of Time

# Poster contributions

Nicola Agius

“Using GAMA and H-ATLAS data to explore the cold dust properties of Early-Type Galaxies”

Ellen Andrae

“Probing the opacity of local Universe GAMA galaxies using attenuation-inclination relations from the UV to the near-IR”

Ko Arimatsu

“Properties of Mid- to Far- Infrared Dust Emission in the Nearby Superwind Galaxy M82”

George J. Bendo

“Extragalactic Science with ALMA”

Frederic Boone

“The unusual multi-wavelength SED of optical-dropout galaxies”

Igor Chilingarian

“NBursts+phot: parametric recovery of galaxy star formation histories from the simultaneous fitting of spectra and broad-band spectral energy distributions”

Laure Ciesla

“The spectral energy distributions of the complete sample of the Herschel Reference Survey”

André de Castro Milone

“An empirical spectrum library of chemically well characterized stars for stellar population modelling”

Guillaume Drouart

“Decomposition of AGN and Stellar components in High redshift Radiogalaxies from redshift 1 to 5”

A. Eungwanichayapant

“Synchrotron Radiation from Giant Electron/Positron Pair Halos”

Mercedes E. Filho

“Optically Faint AGN in Galaxy Cluster Fields”

Nahiely Flores-Fajardo

“Ionization of the diffuse gas in galaxies : Hot low-mass evolved stars at work”

Anna Gallazzi

“Charting the evolution of the ages and metallicities of the massive galaxy population since  $z=0.7$  with optical spectroscopy”

Frederic Galliano

“Non-Standard Grain Properties, Massive Dark Gas Reservoir, and Extended Submm Excess, Probed by Herschel in the LMC”

Jean Michel Gomes

“Stellar populations in the centers of nearby galaxies”

Jean Michel Gomes

“Spectral Fitting of SDSS Passive Galaxies with alpha-enhanced Single Stellar Population”

Lucia Guaita

“Spectral energy distribution properties of  $z\sim 2$  star forming galaxies”

Philip Günster

“Spectroscopic features of the superthin LSB galaxy UGC12281”

C. Henkel

“A CO J=3-2 Survey of Galaxies - Implications for Molecular SEDs”

Israel Hermelo

“Modelling the dust heating and emission in the dwarf galaxy NGC 4214”

Benne W. Holwerda

“NHMESES and HEROES observations of NGC 4244 and NGC 891”

Benne W. Holwerda

“Looking at the distant Universe with the MeerKAT Array (LADUMA)”

Noelia Jiménez

“The impact of thermally pulsing asymptotic giant branch stars on the red sequence of clusters galaxies”

Hidehiro Kaneda

“The next-generation infrared astronomy mission SPICA”

Ivan Katkov

“Multi-component parametric inversion of galaxy kinematics and stellar populations using full spectral fitting”

Mina Koleva

“Stellar population models in the blue”

Ralf Kotulla

“Using GALEV and photometric redshifts to study galaxy evolution”

Man I Lam

“The Preliminary results on morphological IR relation on GAMA Galaxies in the Hershel ATLAS Field”

Yoshiki Matsuoka

“Cosmic Optical Background: the View from Pioneer 10/11”

S. Meneses-Goytia

“Spectral Energy Distributions of Single Stellar Populations in the Infrared range”

Leão Souza João Rodrigo

“A Spitzer Study of Interacting Luminous and Ultra-Luminous Infrared Galaxies”

Jaehyun Lee

“Does the SED of a galaxy constrain its merger history?”

Lijie Liu

“The Global Star Formation Law of Galaxies Revisited in the Radio Continuum”

Carol Lonsdale

“Feedback from the most luminous dust-obscured AGNs in the universe”

Nidia Lugo

“Model for simulate the Temporal Evolution of the  $H\beta$  Luminosity, FUV and NUV flux of Stellar Population of a Galaxy”

W. J. Maciel

“The star formation rate in the Milky Way: results from stars and planetary nebulae”

John MacLachlan

“The Dust Distribution in Late Type Low Surface Brightness Disks”

Gladis Magris C.

“A new bayesian approach to quantify the uncertainties in the determination of galaxy properties derived from spectral fits”



Minnie Mao Yuan

“No Evidence for Evolution in the Far-Infrared Radio Correlation out to  $z \sim 2$  in the eCDFs”

A. M. Mickaelian

“Spectral Energy Distribution and classification of bright active galaxies”

Danielle M. Nielsen

“The current star formation rate of K+A galaxies”

R. A. Ortega-Minakata

“What makes a galaxy radio loud?”

Bogdan Adrian Pastrav

“Dust effects on the derived photometric parameters of disks and bulges in spiral galaxies”

Ando Lalaina Ratsimbazafy

“Age-dating Stellar populations of Luminous Red Galaxies”

Mónica Relaño

“SED analysis of HII regions in M33”

Aurélie Rémy

“Characterising the FIR/submm Emission of Dwarf Galaxies : First Results of the Herschel Key Program, The Dwarf Galaxies Survey”

Myriam Rodrigues

“Retrieve stellar populations in starbursts”

Kate Rowlands

“H-ATLAS/GAMA: A multiwavelength view of dusty early-type galaxies and passive spirals”

Paul Ruffle

“Identification of mid-infrared point sources in the Magellanic Clouds”

David Sanchez

“The challenging SED of AP Librae (PKS1514-241)”

Patricia Sanchez-Blazquez

“The SFH of disk galaxies”

Andrew Schechtman-Rook

“The 3-Dimensional Structure of NGC 891”

Chris Sedgwick

“Optical Spectroscopy of Far-infrared Sources in the AKARI/Spitzer/Herschel near-SEP Deep Field”

Kwang-il Seon

“Detection of a Large Amount of Diffuse Extraplanar Dust in NGC 891”

Zhengyi Shao

“Constrain the stellar population gradients of elliptical galaxies with SED”

Olga K. Silchenko

“Outer disks of lenticular galaxies”

Dan Smith

“The SEDs of galaxies selected at 250um”

Laura K. Sturch

“TYPHOON Observations of the Lindsay-Shapley Ring”

Toyoaki Suzuki

“AKARI observations of the multiphase intergalactic medium of Stephan's Quintet”

Ryan Swindle

“Measuring Systematic Effects in Early-Type Galaxy Stellar Masses from Photometric SED Fitting”

F.S. Tabatabaei

“Variation in the dust emissivity index across M33 (HerM33es)”

Qinghua Tan

“High Resolution SMA Imaging of (Ultra)-Luminous Infrared Galaxies”

Tomislav Terzic

“Multiwavelength observations of the radio quasar 4C 21.35”

Yoshiki TOBA

“The Mid-Infrared Luminosity Function of Galaxies by using AKARI mid-infrared All-Sky Survey Catalogue”

Tova Yoast-Hull

“Cosmic Ray Production and Emission in M82”

Jing Wang

“Inside-out disk formation and subsequent bar-driven evolution in the local universe”

Sukyoung Yi

“UV upturn as a test for Helium Sedimentation in Dark Halo Evolution”

Fang-Ting Yuan

“Mid-infrared and Star Formation Properties from the Spectral Energy Distribution (SED) of Galaxies”

O. V. Zakhozhay


“The Results of SEDs Modeling for Substars with Protoplanetary Disks”

Zhiyu Zhang

“Multiple CS line survey in local star-forming galaxies”

Stefano Zibetti

“Direct constraints on the impact of TP-AGB stars on the SED of galaxies from NIR spectroscopy”



# **The Beauty of Galaxies: from the Milky Way to the Beginning of Time**

**A public talk by  
Prof. Don Kurtz  
Jeremiah Horrocks Institute  
University of Central Lancashire**

**Friday 9 September 2011 19:00**

**Harrington Lecture Theatre  
University of Central Lancashire**

**admission free  
no tickets necessary**

The Jeremiah Horrocks Institute of the University of Central Lancashire will host a major meeting sponsored by the International Astronomical Union the week of 5-9 September with 150 professional astronomers from around the world converging to discuss the latest research on the nature of the light emitted by galaxies. In conjunction with this meeting Prof. Don Kurtz will give a public talk showing and explaining some of the most beautiful pictures of the universe from giant ground-based telescopes, from the Hubble Space Telescope, from the Spitzer and Herschel Space Telescopes. See stars and planets being born, stars dying, stars exploding, swirling gas clouds, stars made of solid "diamond", galaxies in unprecedented detail, gas jets shooting out of giant black holes at nearly the speed of light, crashing and cannibalistic galaxies, and the deepest-space, most distant photographs ever taken, looking back more than 10 billion years in time, nearly to the birth of the Universe. These mind-boggling pictures are stunning natural works of art.

## SED2011 List of Participants

<b>Surname</b>	<b>Forename</b>	<b>Country</b>	<b>Gender</b>
Acquaviva	Viviana	USA	Female
Agius	Nicola	UK	Female
Andrae	Ellen	Germany	Female
Arimatsu	Ko	Japan	Male
Bamford	Steven	UK	Male
Bendo	George	UK	Male
Boulanger	Francois	France	Male
Bromage	Gordon	UK	Male
Bruzual	Gustavo	Venezuela	Male
Buat	Veronique	France	Female
Bureau	Martin	UK	Male
Burgarella	Denis	France	Male
Chakrabarti	Sukanya	USA	Female
Chilingarian	Igor	Russia	Male
Clarke	Adam	UK	Male
Clements	David	UK	Male
Clowes	Roger	UK	Male
Cooray	Asantha	USA	Male
Costamante	Luigi	Italy	Male
Crocker	Roland	Germany	Male
da Cunha	Elisabete	Germany	Female
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De Looze	Ilse	Belgium	Female
Deil	Christoph	Germany	Male
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Dominguez	Alberto	USA	Male
Driver	Simon	Australia	Male
Drouart	Guillaume	ESO	Male
Dunne	Loretta	New Zealand	Female
Efstathiou	Andreas	Cyprus	Male
Elkin	Vladimir	UK	Male
Elmegreen	Bruce	USA	Male
Eungwanichayapant	Anant	Thailand	Male
Ferreras	Ignacio	UK	Male
Filho	Mercedes	Portugal	Female
Flores-Fajardo	Nahiely	Mexico	Female
Gallagher	John (Jay)	USA	Male
Gallazzi	Anna	Denmark	Female
Galliano	Frederic	France	Male
Gao	Yu	China	Male
Gibson	Brad	UK	Male
Gomes	Jean Michel	Portugal	Male
Grootes	Meiert Willem	Germany	Male
Groves	Brent	Germany	Male
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Günster	Philip	Germany	Male
Hambleton	Kelly	UK	Female
Harvey	Paul	USA	Male
Hassall	Barbara	UK	Female

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Jeong	Hyunjin	South Korea	Male
Jiménez	Noelia	Argentina	Female
Johnson	Benjamin	France	Male
Jones	David	Germany	Male
Kaneda	Hidehiro	Nagoya	Male
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Kaviraj	Sugata	UK	Male
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Lacy	Mark	USA	Male
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Lee	Jaehyun	South Korea	Male
Leitherer	Claus	USA	Male
Lisenfeld	Ute	Spain	Female
Liu	Lijie	China	Female
Lonsdale	Carol	USA	Female
Lugo	Nidia	Venezuela	Female
Maciel	Walter	Brazil	Male
MacLachlan	John	UK	Male
Madden	Suzanne	France	Female
Madore	Barry	USA	Male
Magris Crestini	Gladis	Venezuela	Female
Mao	Minni	Australia	Female
Martin	Christopher	USA	Male
Matsuoka	Yoshiki	Japan	Male
Mattila	Kalevi	Finland	Male
Maxwell	Michael	UK	Male
McDermid	Richard	USA	Male
Meidt	Sharon	Germany	Female
Meneses-Goytia	Sofia	The Netherlands	Female
Mentuch	Erin	Canada	Female
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Moustakas	John	USA	Male
Murphy	Simon	UK	Male
Natale	Giovanni	UK	Male
Nielsen	Danielle	USA	Female

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Porter	Troy	USA	Male
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Thompson	Todd	USA	Male
Toba	Yoshiki	Japan	Male
Torii	Kazufumi	Japan	Male
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Wang	Jing	Germany	Female
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Zakhzhay	Olga	Ukraine	Female
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Zhang	Hong-Xin	USA	Male
Zhang	Zhiyu	Germany	Male

SED2011 List of Participants

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## Scientific Highlights of IAU Symposium 284

IAU Symposium 284, jointly organised by the University of Central Lancashire (Preston) and the Max-Planck Institut für Kernphysik (Heidelberg), brought together developers and users of self-consistent physical or semi-empirical models for the emergent panchromatic spectral energy distributions (SEDs) of galaxies ranging over the complete accessible spectral range from gamma-rays to radio. Motivated by the rapid development in the corresponding observational capabilities in the last decade, the main goal of the symposium was to provide a forum for the interaction of modellers with both observers assembling multiwavelength datasets on galaxies and theoreticians considering fundamental physical processes in galaxies.

The program was fashioned to reflect the interconnections between the very broad range of physical processes responsible for the panchromatic photon output of galaxies. This embraced the formation, evolution and emission of stars; accretion-driven sources of photons; the chemical and physical properties of the interstellar medium, including both the gaseous and solid-state components and their interactions with ambient photon fields; and high energy processes involving cosmic rays. On the last day a final session was dedicated to models for the evolution of the panchromatic SEDs of galaxies over cosmological time, thus linking the detailed physical processes in individual galaxies discussed earlier in the week with the photon output of the Universe.

All of these topics have, of course, been the subjects of many dedicated individual symposia in the past, attended largely by their own specialized communities. However, IAU symposium 284 was unique in its concept of connecting the topics and bringing together the communities (or at least making a significant step towards achieving this). A particular challenge of this concept was to avoid the symposium becoming a sequence of self-contained mini-workshops on each of the constituent topics, addressing selected topical issues directed at, and attended by, one particular community. However, in this respect any prior concerns proved to be completely unfounded. All the delegates, representing a mix of theoreticians, observers, and specialists in the many technical and astrophysical subfields needed to build SED models, proved to be enthusiastic and proactive participants throughout the week, generating many perceptive, and sometimes unexpected interdisciplinary discussions following both the oral presentations (many of these discussions could be documented for inclusion in the proceedings) and in the poster

sessions. There were no parallel sessions. In general, the intellectual atmosphere was open and constructive, with several known examples of new collaborations arising from discussions initiated at the symposium. For this, particular thanks must go to the authors for their careful preparation of the presentations. These were generally well directed to the broad audience, while very effectively answering the call for papers to highlight techniques and results combining measurements made from across the electromagnetic spectrum. Indeed, this response to the symposium confirms the genuine need and demand for more effective quantitative analysis techniques to exploit the already copious amounts of multiwavelength data now available for galaxies near and far.

The open and exploratory tone for the symposium was set by the introductory review by Barry Madore (“The Reification of Galaxies: Cognitive Astrophysics and the Multiwavelength Inverse Problem”) which, using examples from everyday life and the art world as well as from astrophysics, was a thought-provoking philosophical discourse on the extent to which astrophysicists can ever hope to extract a “true and complete” understanding of galaxies based on the unavoidably biased viewpoints available to us. Throughout the succeeding sessions, many examples of this fundamental issue emerged, both positive, in the sense of a different (and perhaps better informed) picture emerging from a multiwavelength view, and negative, in the sense that we may not have been aware, or cannot easily observationally constrain, some fundamental property shaping galaxian SEDs. A vivid (and, to many, unexpected) example of the latter was contained in the review by Claus Leitherer on population synthesis, which emphasised that the effective temperature, luminosity and ionising radiation of massive stars was strongly dependent not only on mass and metallicity, but also on the rotation of the stars. Examples of the former came in several presentations showing impressive comparisons between the observed UV/optical-FIR/submm emission of various types of galaxies and AGN, and predictions based on radiation transfer calculations.

A particular highlight of the meeting was the session linking low- and high-energy properties of galaxies. Although mainly confined to the Milky Way (included as a separate topic for this reason) and the two starburst galaxies already detected in gamma-rays by ground and space-borne facilities, the session confirmed the very rich potential of a combined analysis of the radio tracers of interstellar gas, infrared/optical tracers of photon fields and dust column, and the low and high energy gamma-ray tracers of gas and cosmic ray electrons and protons. Various presentations showed new modelling

results on different aspects of this, connecting issues such as the nature of the so-called “dark gas”, the emissivity of grains, the energy-dependent propagation of cosmic rays (both within gas clouds and on galaxy-wide scales), and the strength of ambient magnetic fields. The invited talk of Luigi Costamante in the same session also considered the impact of gamma-ray astronomy on inferences of the UV/optical/infrared emission of the ensemble of distant galaxies, as derived from the attenuation of TeV emission from blazars by pair production in the intergalactic radiation field. This could be compared and contrasted with inferences from direct observations of the extragalactic background light in the UV/optical/infrared, reviewed by Kalevi Mattila, as well as with constraints from theoretical modelling of blazar SEDs. This led on to a detailed consideration of the panchromatic radiation from galaxies as a probe of galaxy formation and evolution by Michael Rowan-Robinson, with strong physical insights to the field.

The symposium was attended by participants from 33 different countries from Europe, North America, South America, Asia, Africa and Australia/Oceania, with a balanced representation between professors, senior scientists and young career scientists, postdoctoral fellows and PhD students. This large variety of scientists from all continents, at different stages in their career and professional achievements, together with the interdisciplinary nature of the meeting led to a fantastic scientific interaction between delegates, as documented in the written feedback received from the participants.

The large and international attendance of the Symposium, as well as the prestige brought by the invited speakers and members of the SOC attracted a lot of public attention in Lancashire. This was reflected by the impressive attendance of the public talk by Prof. Don Kurz from the University of Central Lancashire, on “The Beauty of Galaxies: from the Milky Way to the Beginning of Time”, organised on the occasion of IAU Symp. 284.

The participants of the symposium very much appreciated the visit and guided tour to the beautiful “Houghton Tower”, with history dating back to the Norman Conquest, and whose famous guests had included William Shakespeare, Charles Dickens and King James I. The conference banquet was held in the main hall of the Tower, in the same room (and, for members of the SOC at the very same same oak table) where King James I, at a banquet held in his honour, famously knighted a loin of beef “Sir Loin”, four hundred years previously.

International Astronomical Union  
Union Astronomique Internationale  
**POST MEETING REPORT FORM**

for meetings other than Joint Discussions and Special Sessions

Deadline for Submission: within 1 month after the meeting

**the following information should be sent  
to the IAU Assistant General Secretary**

The following documents should be attached:

- i. Final Scientific Program
- ii. List of participants
- iii. List of recipients of IAU Grants, including amount and country
- iv. Receipts signed by the recipients of IAU Grants (This does not apply to Scientific Meetings held during General Assemblies)
- v. Brief report (text.txt file or word.doc) to the Executive Committee on the scientific highlights of the meeting (1-2 pages)

1. Meeting Number: IAU Symposium 285
2. Meeting Title: *New Horizons in Time Domain Astronomy*
3. Coordinating Division: XII (Commission 5)
4. Dedication of meeting (if any):
5. Location (city, country): Oxford, UK
6. Dates of meeting: September 19-23, 2011
7. Number of participants: 239 (22% women, 78% men)
8. List of represented countries:
  1. Armenia (1)
  2. Australia (11)
  3. Austria (1)
  4. Belgium (4)
  5. Brazil (1)
  6. Bulgaria (2)
  7. Canada (10)
  8. Chile (2)
  9. China (2)
  10. Denmark (1)
  11. Finland (1)
  12. France (3)
  13. Georgia (1)
  14. Germany (7)
  15. Hungary (2)
  16. India (1)
  17. Ireland (3)
  18. Israel (4)
  19. Italy (4)
  20. Japan (5)
  21. Korea (1)
  22. Netherlands (9)
  23. Poland (1)
  24. Russia (2)
  25. South Africa (7)
  26. Spain (6)

- 27. Sweden (1)
  - 28. Switzerland (5)
  - 29. Ukraine (2)
  - 30. UK (52)
  - 31. USA (87)
9. Report submitted by: Elizabeth Griffin, Robert Hanisch, Co-Chairs of SOC
10. Date and place: March 23, 2012, Victoria, BC, Canada and Baltimore, MD, USA
11. Signature of SOC Chairperson:

Elizabeth Griffin

R Hanisch

# NEW HORIZONS

## IN TIME DOMAIN ASTRONOMY

New Horizons in Time Domain Astronomy,  
Oxford September 18<sup>th</sup>-23<sup>rd</sup> 2011

# Symposium Schedule

SUNDAY, September 18th, 2011: Opening reception and conference registration

6:30 pm - 8.30 pm	Opening reception and conference registration <i>Denys Wilkinson Building, Keble Road</i>
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Invited talks (I) are 20 minutes + 5 minutes for questions

Contributed talks (C) are 12 minutes + 3 minutes for questions

MONDAY, September 19th, 2011: "Can our data meet the challenges?"

8:00 am - 4:00 pm	REGISTRATION
8:45am - 9:05 am	Welcome to Oxford: <i>The Lord Mayor of Oxford, Cllr. Elise Benjamin, and Prof. Roger Davies, Head of Oxford Astrophysics Prof. Bob Hanisch (Co-chair, SOC)</i>
9:05 am - 9.35 am	KEYNOTE ADDRESS: Brian Warner: <i>"The power of the unexpected"</i>
9:35 am - 10:25 am	PLENARY SESSION ONE (Chair: Bob Hanisch)
	09:35am Brian Schmidt (I): <i>"New wide-field optical surveys"</i> 10:00am Rob Fender (I): <i>"The scientific potential of LOFAR"</i>
10:25 am - 10:55 am	COFFEE/TEA
10:55 am - 1.00 pm	PLENARY SESSION TWO (Chair: Rob Seaman)
	10:55am Hans Kjeldsen (I): <i>"CoRoT, MOST, and Kepler"</i> 11:20am Josh Grindlay (I): <i>"Opening the 100yr time domain astronomy window with DASCH"</i> 11:45am Phil Charles (I): <i>"Long-term Monitoring with Small and Medium-sized Telescopes on the Ground and in Space"</i> 12:10pm Francesca Primas (I): <i>"Spectroscopic surveys"</i> 12:35pm Neil Gehrels (I): <i>"Swift and Fermi Time Domain Astronomy"</i>
1:00 pm - 2:00 pm	LUNCH BREAK
2:00 pm - 3:30 pm	Workshops and break-out sessions - see separate programme
3:30 pm - 4:00 pm	COFFEE/TEA
4:00 pm - 5:00 pm	Workshops and break-out sessions - see separate programme
5:30 pm - 6:30 pm	RECEPTION HOSTED BY THE LORD MAYOR OF OXFORD, TOWN HALL
7:30 pm - 9:00 pm	PUBLIC LECTURE Prof. Martin Rees: <i>"From microseconds to aeons - How our complex cosmos emerged"</i> Oxford University Museum of Natural History; tickets required

TUESDAY, September 20th, 2011: "Explosive or irreversible changes"

8:30 am - 4:00 pm	REGISTRATION
09:00 am - 10:35 am	PLENARY SESSION THREE (Chair: Mark Sullivan)
	09:00am Jim Cordes (I): <i>"The dynamic radio sky"</i> 09:25am Shri Kulkarni (I): <i>"Explosive events in the cosmos"</i> 09:50am Mansi Kasliwal (C): <i>"Systematically bridging the gap between novae and supernovae"</i> 10:05am Howard Bond (C): <i>"Intermediate-luminosity red transients"</i> 10:20am Isobel Hook (C): <i>"Transients with Euclid and the E-ELT"</i>
10:35 am - 11:05 am	COFFEE/TEA
11:05 am - 12.45 pm	PLENARY SESSION FOUR (Chair: Tara Murphy)
	11:05am Lars Bildsten (I): <i>"Explosions on a variety of scales"</i> 11:30am Stephen Smartt (I): <i>"Transients with Pan-STARRS-1"</i> 11:55am Armin Rest (C): <i>"Light echoes of transients and variables"</i> 12:10pm Brad Cenko (C): <i>"A new class of relativistic outbursts from the nuclei of distant galaxies"</i> 12:25pm Joe Lazio (C): <i>"EM counterparts to LIGO-VIRGO events: EVLA observations"</i>
12:45 pm - 2:00 pm	LUNCH BREAK
2:00 pm - 3:30 pm	Workshops and break-out sessions - see separate programme
3:30 pm - 4:00 pm	COFFEE/TEA
4:00 pm - 5:30 pm	Workshops and break-out sessions - see separate programme

WEDNESDAY, September 21st, 2011: "Things that tick"

8:30 am - 12:00 pm	REGISTRATION
9:00 am - 10:30 am	PLENARY SESSION FIVE (Chair: Patricia Whitelock)
	09:00am Ben Stappers (I): <i>"Pulsars"</i> 09:25am Jason Hessels (C): <i>"Charting the radio sky on sub-second time scales with LOFAR"</i> 09:40am Don Kurtz (I): <i>"Astero-seismology"</i> 10:05am Roger Griffin (I): <i>"Radial velocities: new science and new trends"</i>
10:30 am - 11:00 am	COFFEE/TEA
11:00 am - 1.00 pm	PLENARY SESSION SIX (Chair: Keith Horne)
	11:00am Suzanne Aigrain (I): <i>"Probing the physics of planets and stars with transit data"</i> 11:25am A. S-Czerny (I): <i>"Sensitivity of Period Search"</i> 11:50am Tom Loredano (C): <i>"Steps, sines, and droplets: Semiparametric Bayesian modeling of arrival time series"</i> 12:05pm Rebekah Hounsell (C): <i>"Variable stellar object detection and light curves from the solar mass ejection imager"</i> 12:20pm Arne Henden (C): <i>"Surveying the bright sky"</i> 12:35pm Barry Welsh (C): <i>"High time resolution astronomy on the SALT 10m"</i>
1:00 pm	CONFERENCE PHOTO
	FREE AFTERNOON



THURSDAY, September 22nd, 2011: "Irregular and aperiodic changes"

8:30 am - 5:00 pm	REGISTRATION
8:45 am - 10:20 am	PLENARY SESSION SEVEN (Chair: Arne Henden)
	08:45am Erin Bonning (I): "AGNs, blazars, QSOs" 09:10am Stefano Ciprini (C): "Gamma-ray waveband and multi-waveband variability of blazars" 09:25am Keith Horne (C): "Echo mapping of AGN" 09:40am Franz Kerschbaum (I): "Variable red giants" 10:05am Geoffrey Clayton (C): "Two centuries of observing R Coronae Borealis"
10:20 am - 10:50 am	COFFEE/TEA
10:50 am - 1:00 pm	PLENARY SESSION EIGHT (Chair: Aris Karastergiou)
	10:50am Rachel Osten (I): "Probing magnetic mysteries with stellar flares" 11:15am Isabelle Baraffe (I): "Stellar evolution in 3D" 11:40am Stephen Potter (I): "Polarimetric variability" 12:05pm Mark Walker(I): "Microscopy of the Interstellar Medium" 12:30pm Hayley Bignall (C): "The extreme scintillating quasar PKS 1257-326 revisited: What have we learned?" 12.45pm W. L. Diaz Merced (C): "Sonification prototype for 2D data analysis"
1:00 pm - 2:15 pm	LUNCH BREAK
2:15 pm - 3:45 pm	Workshops and break-out sessions - see separate programme
3:45 pm - 4:15 pm	COFFEE/TEA
4:15 pm - 5:45 pm	Workshops and break-out sessions - see separate programme
7:15 pm (for 7.30pm)	CONFERENCE DINNER, WADHAM COLLEGE

FRIDAY, September 23rd, 2011: "Preparing for the future"

8:30 am - 12:00 pm	REGISTRATION
9:00 am - 10:30 am	PLENARY SESSION NINE (Chair: Brian Schmidt)
	09:00am George Djorgovski (I): "Science strategies of synoptic sky surveys" 09:25am Laurent Eyser (I): "From Hipparcos to GAIA" 09:50am Michael Kramer(I): "Pulsars, SKA and Time Domain Studies in the Future" 10:15am J-P. Macquart (C): "Optimal strategies for transient surveys with wide field radio telescopes"
10:30 am - 11:00 am	COFFEE/TEA
11:00 am - 12.55 pm	PLENARY SESSION TEN (Chair: Elizabeth Griffin)
	11:00am Lucianne Walkowicz (I): "The Future of the Time Domain with LSST" 11:25am Nicholas White (I): "Next-generation X-ray astronomy" 11:50am 5min Workshop Summaries and "Breaking News"
1:00 pm - 2:15 pm	LUNCH BREAK
	2:15pm Josh Bloom (I): "Technical and observational challenges for exploration of the time domain in the future" 2:40pm Rosemary Wyse (I): "Conference summary" 3:05pm DISCUSSION
3:30 pm - 4:00 pm	COFFEE/TEA
	END OF SYMPOSIUM

## Schedule for afternoon workshops and breakout sessions

	Lecture Theatre	JCR	Room A	Room C	Room D
<b>Monday 2pm (90min)</b>	Optical/NIR transient surveys (I)	The CoRoT and Kepler Revolution in Stellar Variability Studies	SWIFT: Opportunities, Capabilities, and Data Handling	Gravitational Waves (I)	
<b>Monday 4pm (60min)</b>	Optical/NIR transient surveys (II)	Communicating stellar variability		Gravitational Waves (II)	
<b>Tuesday 2pm (90min)</b>	Extreme physics (I)	X-Ray Transient surveys	Gravitational Microlensing	Using the VO to Study the Time Domain (I)	Light Echoes
<b>Tuesday 4pm (90min)</b>	Extreme physics (II)	Small and Robotic Telescopes	Binarity and Stellar Evolution	Using the VO to Study the Time Domain (II)	Astromotography
<b>Thursday 2.15pm (90min)</b>	Algorithms for Time Series Analysis (I)	Faint and Fast Transients	Tidal Disruption Flares (I)	Radio Transients (I)	Historical Time Domain Astronomy Data, Processing and Distribution
<b>Thursday 4.15pm (90min)</b>	Algorithms for Time Series Analysis (II)	Data Management, Infrastructure, and Archiving for Time Domain Science	Tidal Disruption Flares (II)	Radio Transients (II)	The Amateur Community and Citizen Science

**All room allocations  
are provisional**

**Room Capacities**  
 Main Theatre: 240  
 Room A: 50  
 JCR lecture theatre: 100  
 Room C: 50  
 Room D: 40

## IAU 285 Participant Summary

	<i>Name</i>	<i>Affiliation</i>	<i>Country</i>
1	Suzanne Aigrain	University of Oxford	UK
2	Anastasia Alexov	University of Amsterdam / API	Netherlands
3	Richard I. Anderson	Geneva Observatory	Switzerland
4	Iair Arcavi	Weizmann Institute of Science	Israel
5	Carles Badenes	University of Pittsburgh	USA
6	Raymundo Baptista	Universidade Federal de Santa Catarina	Brazil
7	Isabelle Baraffe	University of Exeter	UK
8	Cesare Barbieri	University of Padova	Italy
9	Tom Barclay	NASA Ames Research Center	USA
10	Paul Beck	Univ. Leuven	Belgium
11	Andy Becker	University of Washington	USA
12	Timothy C. Beers	Michigan State University and JINA	USA
13	Guillaume Belanger	ESAC, European Space Agency	Spain
14	Jocelyn Bell Burnell	University of Oxford	UK
15	Vasily Belokurov	IoA, Cambridge	UK
16	József Benkő	Konkoly Observatory	Hungary
17	Misty Bentz	Georgia State University	USA
18	David Bersier	Liverpool John Moores University	UK
19	Steven Bickerton	Princeton University	USA
20	Hayley Bignall	ICRAR - Curtin University	Australia
21	Lars Bildsten	Kavli Institute for Theoretical Physics, UC Santa Barbara	USA
22	Sarah Blake	University of Oxford	UK
23	Josh Bloom	UC Berkeley	USA
24	Katherine Blundell	Oxford Astrophysics	UK
25	Mike Bode	Liverpool JMU	UK
26	Howard E Bond	Space Telescope Science Institute	USA
27	Erin Bonning	Yale University	USA
28	Regis Cartier	Universidad de Chile	Chile
29	Brad Cenko	University of California, Berkeley	USA
30	Joan Centrella	NASA's Goddard Space Flight Center	USA
31	Seo-Won Chang	Department of Astronomy, Yonsei University, Korea	Korea
32	Phil Charles	SAAO/UCT/Southampton	South Africa
33	Eric Chassande-Mottin	APC CNRS Univ Paris Diderot	France
34	Doron Chelouche	Haifa University	Israel
35	Anton Chernenko	Space Research Institute	Russia
36	Stefano Ciprini	ASI Science Data Center & INAF Roma Observatory	Italy
37	Geoff Clayton	Louisiana State University	USA
38	Susan Collins	NUI Galway	Ireland
39	Chris Copperwheat	University of Warwick	UK
40	Stephane Corbel	University Paris Diderot & CEA Saclay	France
41	Jim Cordes	Cornell University	USA
42	Kevin Covey	Cornell University	USA
43	Steve Croft	UC Berkeley	USA
44	Nick Cross	IfA, Edinburgh	UK
45	Maria Cruz	Science Magazine	UK
46	Jan Cuypers	Royal Observatory of Belgium	Belgium
47	James Davenport	University of Washington	USA

48	Ed Daw	The University of Sheffield	UK
49	Deanne de Bude	University of Cape Town	South Africa
50	Diarmaid de Burca	National University of Ireland,Galway	Ireland
51	Pieter Degroote	Instituut voor Sterrenkunde	Belgium
52	Wanda L. Diaz Merced	University of Glasgow	UK
53	George Djorgovski	Caltech	USA
54	Andrew Drake	Caltech	USA
55	Pierre Dubath	Geneva Observatory	Switzerland
56	Alessandro Ederoclite	Instituto de Astrofísica de Canarias	Spain
57	Peter Eggleton	LLNL	USA
58	Tom Evans	Oxford University	UK
59	Laurent Eyer	Geneva Observatory	Switzerland
60	Stephen Fairhurst	Cardiff University	UK
61	Glennys Farrar	New York University	USA
62	Rob Fender	University of Southampton	UK
63	Matilde Fernandez	Institute de Astrofisica de Analucia	Spain
64	Helene Flohic	Universidad de Chile	Chile
65	Boris Gaensicke	University of Warwick	UK
66	Bryan Gaensler	CAASTRO / U. Sydney	Australia
67	Jonathan Gair	University of Cambridge	UK
68	Neil Gehrels	NASA/GSFC	USA
69	Luis J. Goicoechea	University of Cantabria	Spain
70	Matthew Graham	California Institute of Technology	USA
71	Elizabeth Griffin	HIA/DAO	Canada
72	Roger Griffin	Cambridge	UK
73	Sean C. Griffin	McGill University	Canada
74	Josh Grindlay	Harvard University	USA
75	Ellie Hadjiyska	Yale University	USA
76	Daryl Haggard	Northwestern University/CIERA	USA
77	Pasi Hakala	FINCA, U.of Turku	Finland
78	Paul Hancock	SfA, The University of Sydney	Australia
79	Robert Hanisch	STScI/VAO	USA
80	Patrick Hartigan	Rice University	USA
81	Kazuhiro Hayama	NAOJ	Japan
82	Arne Henden	AAVSO	USA
83	Jason Hessels	ASTRON	Netherlands
84	Tom Hettinger	Michigan State University	USA
85	Ian Heywood	University of Oxford	UK
86	Eric Hilton	Univ. of Hawaii	USA
87	Wynn Ho	University of Southampton	UK
88	Simon Hodgkin	IoA, Cambridge	UK
89	Doug Hoffman	IPAC/Caltech	USA
90	Isobel Hook	U. Oxford and INAF Obs. Rome	Italy
91	Keith Horne	SUPA St Andrews	UK
92	Rebekah Hounsell	Liverpool John Moores University	UK
93	Ted Jaeger	NRL	USA
94	Dayton Jones	JPL	USA
95	Derek Jones	Institute of Astronomy, Cambridge	UK
96	Noé Kains	ESO	Germany
97	Aris Karastergiou	Oxford University	UK

98	Sergey Karpov	SAO of Russian Academy of Sciences	Russia
99	Mansi M. Kasliwal	Carnegie Observatories & Princeton University	USA
100	JJ Kavelaars	Herzberg Institute of Astrophysics	Canada
101	Evan Keane	Max Planck Institute for Radio Astronomy	Germany
102	Franz Kerschbaum	Univ. Vienna	Austria
103	Michael Kesden	New York University	USA
104	Dae-Won Kim	Harvard-Smithsonian CfA	USA
105	Oliver King	Caltech	USA
106	Hans Kjeldsen	Aarhus University	Denmark
107	Katrien Kolenberg	Harvard-Smithsonian Center for Astrophysics	USA
108	Stefanie Komossa	MPE	Germany
109	Vlad Kondratiev	ASTRON	Netherlands
110	Nick Konidaris	Caltech	USA
111	Michael Kramer	MPI fuer Radioastronomie	Germany
112	Shrinivas Kulkarni	California Institute of Technology	USA
113	Omar Kurtanidze	Abastumani Observatory	Georgia
114	Don Kurtz	University of Central Lancashire	UK
115	Stefan Larsson	Stockholm University	Sweden
116	Joseph Lazio	JPL - SPDO	USA
117	Matthew Lehner	ASIAA	China
118	Andrew Levan	University of Warwick	UK
119	David Levitan	Caltech	USA
120	Tim Lister	Las Cumbres Observatory (LCOGT)	USA
121	Kitty Lo	University of Sydney	Australia
122	Giuseppe Lodato	University of Milano	Italy
123	Tom Loredó	Cornell University	USA
124	Jean-Pierre Macquart	ICRAR/Curtin University	Australia
125	Greg Madsen	The University of Sydney	Australia
126	Kate Maguire	Oxford	UK
127	Ashish Mahabal	California Institute of Technology	USA
128	Ravinder Manchanda	Tata Institute	India
129	Ilya Mandel	University of Birmingham	UK
130	Bruce Margon	Univ. California Santa Cruz	USA
131	Tom Matheson	NOAO	USA
132	Jaymie Matthews	University of British Columbia	Canada
133	Amy McQuillan	Oxford University	UK
134	John Menzies	SAAO	South Africa
135	Brian Metzger	Princeton University	USA
136	Areg Mickaelian	Byurakan Astrophysical Observatory (BAO)	Armenia
137	Roberto Mignani	MSSL-UCL	UK
138	Adam Miller	UC Berkeley	USA
139	Marc Moniez	LAL-IN2P3-CNRS	France
140	Paul Moran	Centre for Astronomy NUI Galway	Ireland
141	Takashi Moriya	IPMU, University of Tokyo	Japan
142	Tomoki Morokuma	University of Tokyo	Japan
143	Nami Mowlavi	University of Geneva	Switzerland
144	Carole Mundell	ARI, Liverpool JM Uni	UK
145	Tara Murphy	University of Sydney	Australia
146	Samaya Nisanke	Caltech	USA
147	Andrew Norton	The Open University	UK

148	Peter Nugent	LBNL/UCB	USA
149	Laura Nuttall	Cardiff University	UK
150	Kieran O'Brien	UCSB	USA
151	Rachel Osten	Space Telescope Science Institute	USA
152	Liudmilla Pakuliak	MAO NASU	Ukraine
153	Yen-Chen Pan	University of Oxford	UK
154	Javier Pascual	Instituto de Astrofísica de Andalucía-CSIC	Spain
155	Joe Patterson	Columbia Univ.	USA
156	Nikki Pekeur	Durham University	UK
157	Karim Pichara	Harvard	USA
158	Tsvi Piran	The Hebrew University	Israel
159	Peter Plavchan	Caltech/NExScI	USA
160	Joël Poels	Institute Astrophysics and Geophysics, University of Liège	Belgium
161	Steve Potter	South African Astronomical Observatory	South Africa
162	Valeriu Predoi	Cardiff University	UK
163	Larry Price	Caltech	USA
164	Francesca Primas	ESO	Germany
165	Tom Prince	Caltech	USA
166	Chris Pritchet	University of Victoria	Canada
167	Pavlos Protopapas	Harvard-Smithsonian Center for Astrophysics	USA
168	Gavin Ramsay	Armagh Observatory	UK
169	Colorado Reed	University of Iowa	USA
170	Armin Rest	STScI	USA
171	Joey Richards	UC Berkeley	USA
172	Barney Rickett	University of California San Diego	USA
173	Stephen Ridgway	NOAO	USA
174	Lorenzo Rimoldini	University of Geneva	Switzerland
175	Pete Roming	Southwest Research Institute	USA
176	Elena M. Rossi	Leiden Observatory	Netherlands
177	Arnold Rots	CfA/SAO	USA
178	Slavek Rucinski	University of Toronto	Canada
179	Bob Rutledge	McGill University	Canada
180	David Schade	National Research Council Canada	Canada
181	Bart Scheers	API/CWI	Netherlands
182	Pim Schellart	Radboud University Nijmegen	Netherlands
183	Brian Schmidt	The Australian National University	Australia
184	Linda Schmidtbreick	ESO	Germany
185	Jeremy Schnittman	NASA Goddard	USA
186	Josiah Schwab	UC Berkeley	USA
187	Alex Schwarzenberg-Czerny	Copernicus Astronomical Centre & Poznań University	Poland
188	Vicky Scowcroft	Carnegie Observatories	USA
189	Rob Seaman	NOAO	USA
190	Alberto Sesana	Albert Einstein Institute	Germany
191	Vycheslav Shalyapin	Institute for Radiophysics and Electronics	Ukraine
192	Hiroto Shihabashi	University of Tokyo	Japan
193	I Chun Shih	Institute of Astronomy, National Tsing Hua University	China
194	Min-Su Shin	University of Michigan	USA
195	Andrew Siemion	University of California, Berkeley	USA
196	Leo Singer	California Institute of Technology	USA
197	Greg Sivakoff	University of Alberta	Canada

198	Stephen Smartt	Queen's University Belfast	UK
199	Arfon Smith	University of Oxford / Galaxy Zoo	UK
200	Ben Stappers	University of Manchester	UK
201	Rhaana Starling	University of Leicester	UK
202	Danny Steeghs	University of Warwick	UK
203	Iain Steele	Liverpool JMU	UK
204	Rachel Street	LCOGT	USA
205	Mark Sullivan	University of Oxford	UK
206	László Szabados	Konkoly Observatory	Hungary
207	Sumin Tang	Harvard University	USA
208	Sander ter Veen	Radboud University Nijmegen	Netherlands
209	Victor Terron	Institute of Astrophysics of Andalusia, IAA-CSIC	Spain
210	Nozomu Tominaga	Konan University/IPMU	Japan
211	Eleonora Troja	NASA/GSFC	USA
212	Cathryn Trott	ICRAR/Curtin University	Australia
213	David Tsang	California Institute of Technology	USA
214	Milcho Tsvetkov	Institute of Astronomy, BAS	Bulgaria
215	Katya Tsvetkova	Institute of Astronomy, BAS	Bulgaria
216	Rachel Tunnicliffe	University of Warwick	UK
217	David Turner	Saint Mary's University	Canada
218	Joeri van Leeuwen	ASTRON	Netherlands
219	Sjoert van Velzen	Radboud University Nijmegen	Netherlands
220	Tom Vestrand	Los Alamos National Laboratory	USA
221	Norman Walker	The Stargazers Trust	USA
222	Mark Walker	Manly Astrophysics	Australia
223	Lucianne Walkowicz	Princeton University	USA
224	Patrick Wallace	STFC / RAL Space	UK
225	Brian Warner	University of Cape Town	South Africa
226	Randall Wayth	Curtin University	Australia
227	Barry Welsh	SSL/UC Berkeley	USA
228	Nicholas White	NASA Goddard Space Flight Center	USA
229	Patricia Whitelock	SAAO and University of Cape Town	South Africa
230	Peter Williams	UC Berkeley	USA
231	Roy Williams	Caltech/LIGO	USA
232	Patrick Woudt	University of Cape Town	South Africa
233	K.T. Wraight	Open University	UK
234	Lukasz Wyrzykowski	Institute of Astronomy University of Cambridge	UK
235	Rosie Wyse	Johns Hopkins University	USA
236	Ofer Yaron	Weizmann Institute	Israel
237	Kimon Zagkouris	Oxford University	UK
238	Ashley Zauderer	Harvard	USA
239	Chris Wolf	Oxford University	UK



## Report on IAU Symposium 285

### *New Horizons in Time-Domain Astronomy*

Symposium 285 focused on the different manifestations of variability, and sought to shed light on new scientific insights which are not apparent when one type of object is studied in isolation. It therefore crossed previously recognized boundaries because the need is precisely to erase those boundaries, to think outside the box. The timing for such a cross-discipline symposium in time-domain astronomy was highly favourable. Major new transient surveys are coming on-line as soon as the next year or two, and their data will drive the respective fields substantially forward at all wavelengths

The core question, “How can technology and collaboration be better harnessed to enhance the science requirements?” was fundamental to the Symposium’s planning. Therefore, as well as highlighting what is actually new and what is promised, the Symposium included a strong didactic content in the form of topical workshops focusing on practical skills and knowledge.

On each day we examined commonalities in the science as revealed by certain types of variability, crossing frequency and time-scale boundaries in the process, and including presentations from database experts on the present and projected status of analysis tools. Talks from different sub-disciplines were intentionally interleaved in order to avoid specialist-level isolation, and speakers rose to the challenge and presented talks that were accessible to a broad audience. Some 110 poster papers were displayed in two multi-day sessions, leading to stimulating discussions over coffee and evening refreshments.

Afternoons were set aside for topical workshops, each organized by participants in the Symposium and structured as they saw fit for discussion of the challenges facing a particular subset of time-domain studies. Topics ran the gamut from Extreme Physics and Gravitational Waves to Stellar Variability, Astrotomography, Light Echoes, Historical Data, and Data Management.

That daily schedule did not permit as many contributed talks as would have been the case in a more conventional programme—only 1 in 9 applicants could be thus accommodated; most of the rest prepared posters instead. We therefore offered all 110 poster presenters the opportunity to submit short write-ups of their posters. One-half accepted, while for the rest the *Proceedings* include their abstracts, modified into summaries. Those who gave invited or contributed talks also had the option of not submitting a write-up if the substance of the talk had or would be published elsewhere. 28% so chose, and for those the *Proceedings* contain just an abstract, again slightly modified into a summary.

An additional highlight of the Symposium was the Monday evening public lecture given by Professor Sir Martin Rees (Baron Rees of Ludlow), FRS and Astronomer Royal, entitled “From Microseconds to  $\mathcal{A}$ ons—How Our Complex Cosmos Emerged.” Held in the auditorium of the Oxford University Museum of Natural History, the talk attracted a full house and was followed by a lively question-and-answer session.

As many remarked, ours was a star-studded cast, and—alas—the promised full-length write-up by the opening speaker of the first session could not be completed because its author was subsequently called to receive the Nobel Prize. The diversity of the topics which appeared to be touched by variability astonished even the organizers, and the capacity number of participants (over 240) whom they attracted ran the whole gamut from senior academics and researchers to programmers and database experts. Oral contributors ranged from seasoned experts to graduate students, including a blind graduate from an ethnic minority.

Comments from participants after the meeting were unanimous in their acclaim. More than anything else, perhaps, the meeting opened up lines of communication and collaboration that had not existed before. On the first day of the meeting a common remark was “I barely know 20% of the people here,” whereas by the end of the week people were saying “I’ve met at least three-quarters of the people, and have started new collaborations that would not have happened otherwise.” The welcoming environment of St. Catherine’s College, wherein nearly all participants of the conference were housed, encouraged many side discussions that often continued in the convivial pubs of Oxford.

While there may not be another conference on time-domain astronomy that casts such a broad net, this one certainly accomplished its goal of being integrative and enabling of cross-cutting research. The organizers are very grateful to the IAU for its generous travel grants, which certainly made all the difference for nearly 30 people; several of those were key participants, speakers or workshop organizers.

*Elizabeth Griffin and Robert Hanisch, Co-Chairs*  
*2012 March 19*

## IAU Symposium 286 – Post meeting report

1.- Meeting number

286

2.- Title of the meeting

Comparative Magnetic Minima: Characterizing Quiet Times in the Sun and Stars

3.- Coordinating Division

Division II

4.- Dedicated to

5.- Location

Auditorio Adolfo Calle, Primitivo de la Reta 1050, Ciudad de Mendoza, Mendoza, Argentina

6.- Dates of meeting

2 – 7 October, 2011

7.- Number of participants

93 persons of which 26 received support from IAU as indicated in the attachment.

8.- Countries represented

23 countries as follows:

Argentina, Belgium, Brazil, Colombia, Costa Rica, Denmark, Finland, France, Germany, Hungary, India, Israel, Italy, Japan, Mexico, Peru, Romania, Russia, Turkey, Spain, Sweden, Switzerland, U.K., U.S.A.

9.- Report submitted by

Cristina H. Mandrini, Instituto de Astronomía y Física del Espacio, IAFE, UBA-CONICET

10.- Date and place

14 November, 2011, Ciudad de Buenos Aires, Argentina

11.- Signature of SOC Chairpersons



Dr. Hebe Cremades – SOC Co-chair



Dr. Sarah Gibson – SOC Co-chair

# IAU Symposium 286 – Attached information

## Summary of scientific program

Keynote talks: 1  
Invited talks: 28  
Solicited talks: 6  
Contributed talks: 28  
Closing discussion: 1  
Poster presentations: 31

A public outreach talk was given at the end of the symposium in Spanish. Amateur astronomers, high school teachers and students, and the general public were invited to attend.

## Final detailed program

### Monday 3 October

8:30 – 9:20 Registration  
9:20 – 9:40 Welcome Words

Session 1 – Solar and Stellar Minima (Chairs: Hebe Cremades, Sarah Gibson)

9:40 – 10:25 Keynote Talk - *The Nature and Significance of Solar Minima* Eric Priest  
10:25 – 10:55 Invited Talk - *Solar and Stellar Activity Diagnostics and Indices* Michael Thompson

10:55 – 11:25 Coffee break

11:25 – 11:45 Solicited Talk - *How Well Do We Know Sunspot Number?* Leif Svalgaard

Session 2 – Dynamos and Cycle Variability (Chairs: Daniel Gómez, Gustavo Guerrero)

11:45 – 12:15 Invited Talk - *Dynamo Action and Magnetic Activity in the Sun and Stars* A. Sacha Brun

12:15 – 12:45 Invited Talk - *Cycles and Cycle Modulation in Large-Scale Turbulent Dynamos* Axel Brandenburg

12:45 – 13:00 Contributed Talk - *Magnetic Helicity Fluxes and their Effect on the Solar Dynamo* Simon Candelaresi, A. Brandenburg

13:00 - 15:00 Lunch break

15:00 – 15:30 Invited Talk - *Kinematic Dynamo Models of the Solar Cycle: Past, Present, and Future* Dibyendu Nandi

15:30 – 16:00 Invited Talk - *Global MHD Simulations of Stellar Dynamos and the Ingredients for Large-scale Field Organization* Matthew Browning, B. Brown, M. Miesch, et al.

16:00 – 16:15 Contributed Talk - *Dynamo Action and Magnetic Buoyancy in Convection Simulations in Simulated Tachoclines* Gustavo Guerrero, P. Käpylä

16:15 – 16:30 Contributed Talk – *Taylor Instability and Stellar Magnetic Fields* Fabio del Sordo, A. Brandenburg \_

16:30 – 16:45 Contributed Talk - *Understanding the Origin of the Extended Minimum of Sunspot Cycle 23* Andrés Muñoz-Jaramillo, D. Nandy, P.C.H. Martens \_

16:45 – 17:15 Coffee break

17:15 – 19:00 Poster Session

## Tuesday 4 October

8:15 – 9:15 Registration

Session 2 – *Dynamos and Cycle Variability* (Chairs: Daniel Gómez, Gustavo Guerrero)

9:15 – 9:45 Invited Talk - *Helioseismic Probing of Dynamo Related Flows* Michael Thompson (on behalf of Frank Hill) \_

9:45 – 10:00 Contributed Talk - *Analyzing the Evolution of the Photospheric Magnetic Field in Terms of Spherical Harmonics and Consequences for the Solar Dynamo* Marc DeRosa, A.S. Brun, J.T. Hoeksema \_

Session 3 – *Comparative Solar Minima from Sun to Earth* (Chairs: Margit Haberreiter, Andrey Tlatov, David Webb)

10:00 – 10:30 Invited Talk – *Helioseismology: A View of the Solar Interior* Yvonne Elsworth

10:30 – 10:45 Contributed Talk - *Reconstruction of Magnetic Field Surges to the Poles from Sunspot Impulses* Nadezhda Zolotova, D.I. Ponyavin \_

10:45 – 11:15 Coffee break

11:15 – 11:45 Invited Talk - *Total Solar Irradiance, Absolute Value and an Estimate of a Long-term Trend from Minimum to Minimum* Werner Schmutz, A. Fehlman, W. Finsterle, M. Suter \_

11:45 – 12:00 Contributed Talk - *The Ni I Lines in the Solar Spectrum* Mariela Vieytes, P. Mauas, J. Fontenla \_

12:00 – 12:15 Contributed Talk - *Modeling the Solar EUV Variability* Margit Haberreiter

12:15 – 12:30 Contributed Talk - *The Use of 17 GHz Radio Emission to Characterize the Solar Minimum* Caius Selhorst, L. Svalgaard, C.G. Giménez de Castro, et al.

12:30 – 13:00 Invited Talk - *Polar Magnetic Fields and Coronal Holes during the Recent Solar Minima* Giuliana de Toma \_

13:00 – 15:00 Lunch break

15:00 – 15:30 Invited Talk - *Global Magnetic Fields: Variation of Solar Minima* Andrey Tlatov, V.N. Obridko \_

15:30 – 16:00 Invited Talk - *The 3D Solar Minimum Corona with Differential Emission Measure Tomography* Alberto Vásquez, R.A. Frazin, Z. Huang, et al. \_

16:00 – 16:15 Contributed Talk - *Solar Cycle 23 and 24 Minima Seen through the Eyes of Coronal MHD Models* Jon Linker, Z. Mikic, P. Riley, et al. \_

16:15 – 16:30 Contributed Talk - *Large-scale Photospheric Flow Patterns around Coronal Structures* Neal Hurlburt [\\_](#)

16:30 – 16:45 Contributed Talk - *The Role of Streamers in the Deflection of Coronal Mass Ejections: Comparison between STEREO 3D Reconstructions and Numerical Simulations* Francesco Zuccarello, A. Bemporad, C. Jacobs, et al.

16:45 – 17:15 Coffee break

17:15 – 17:45 Invited Talk - *The Structure of the Heliosphere in Solar Minima and Consequences on Interplanetary Flux Rope Properties* Sergio Dasso, A.M. Gulisano, P. Démoulin [\\_](#)

17:45 – 18:00 Contributed Talk - *Coronal Transients during Two Solar Minima: Their Source Regions and Interplanetary Counterparts* Hebe Cremades, C.H. Mandrini, S. Dasso [\\_](#)

18:00 – 18:15 Contributed Talk - *Dynamo-driven Plasmoid Ejections above a Spherical Surface* Jörn Warnecke, A. Brandenburg, D. Mitra [\\_](#)

18:15 – 18:30 Contributed Talk - *Dynamic Evolution of Interplanetary Wave Shocks Driven by CMEs* Pedro Corona Romero, J.A. González Esparza [\\_](#)

18:30 – 18:45 Contributed Talk - *Dynamical Evolution of Anisotropies of the Solar Wind Magnetic Turbulent Outer Scale* María Emilia Ruiz, S. Dasso, W.H. Matthaeus, et al. [\\_](#)

### Wednesday 5 October

Session 3 – Comparative Solar Minima from Sun to Earth (Chairs: Margit Haberreitter, Andrey Tlatov, David Webb)

9:00 – 9:30 Invited Talk - *Interplanetary Conditions: Lessons from this Minimum* Janet Luhmann, C.O. Lee, P. Riley, et al. [\\_](#)

9:30 – 9:50 Solicited Talk - *The Floor in the Solar Wind Magnetic Field: Status Report* Ed Cliver [\\_](#)

9:50 – 10:05 Contributed Talk – *Long-term Solar Wind Variations and the Coming Solar Minimum* Ramón López [\\_](#)

10:05 – 10:35 Invited Talk – *Probing the Heliosphere with the Directional Anisotropy of Galactic Cosmic Ray Intensity* Kazuoki Munakata [\\_](#)

10:35 – 10:50 Contributed Talk – *Search for Solar Energetic Particles Signals on Mexico City Neutron Monitor Database* Bernardo Vargas, J.F. Valdés Galicia [\\_](#)

10:50 – 11:15 Coffee break

11:15 – 11:45 Invited Talk – *On the Cause of Extremely Low Geomagnetic Activity during the Recent Deep Solar Cycle Minimum* Ezequiel Echer, B. Tsurutani, W.D. González [\\_](#)

11:45 – 12:00 Contributed Talk – *WHI in the Context of a Long and Structured Solar Minimum: An Overview of Sun-to-Earth Observations* Sarah Gibson, G. de Toma, Y. Elsworth, et al. [\\_](#)

12:00 – 12:30 Invited Talk – *Modeling of the Atmospheric Response to a Strong Decrease of the Solar Activity* Eugene Rozanov, T. Egorova, A. Shapiro, W. Schmutz [\\_](#)

12:30 – 13:00 Invited Talk – *Ionosphere and Upper Atmosphere under the Extremely Prolonged Low Solar Activity of Solar Cycle 23 /24* Inez Batista, C.M.N. Candido, C. Brum, M.A. Abdu [\\_](#)

13:00 – 15:00 Lunch break

Session 4 – Stellar Cycles (Chairs: Cristina Mandrini, Adriana Válio)

15:00 – 15:30 Invited Talk – *Stellar cycles: General Properties and Future Directions* Mark Giampapa \_

15:30 – 16:00 Invited Talk - *Investigating Stellar Surface Rotation Using Observations of Starspots* Heidi Korhonen \_

16:00 – 16: 20 Solicited Talk – *Modulated Stellar and Solar Cycles: Parallels and Differences* K. Oláh, Lidia van Driel- Gesztelyi \_

16:20 – 16:35 Contributed Talk – *The Solar Wind in Time: Internal and External Forcing* Jeffrey Linsky, B. Wood, S. Redfield \_

16:35 – 16:50 Contributed Talk – *Stellar Activity Cycles in a Model for Magnetic Flux Generation and Transport* Emre Isik \_

16:50 – 17:15 Coffee break

17:15 – 19:00 Poster Session

Thursday 6 October

Session 4 – Stellar Cycles (Chairs: Cristina Mandrini, Adriana Válio)

9:00 – 9:30 Invited Talk – *Magnetic Activity among Cool Stars in the HR-diagram* Jürgen Schmitt

9:30 – 9:45 Contributed Talk – *On the Origin of Stellar Magnetic Fields* Raphael Steinitz, J. Portnoy \_

9:45 – 10:15 Invited Talk – *Semi-empirical Modeling of Solar/Stellar Magnetic Cycles* Adriana Válio \_

10:15 – 10:30 Contributed Talk – *The Rotation-activity Connection in Young Low Mass Stars* Jenny Rodríguez Gómez, O. Restrepo Gaitán, M. Cuervo Oses, G. Pinzón Estrada \_

10:30 – 10:50 Solicited Talk – *12 Years of Stellar Activity Observations in Argentina* Pablo Mauas, A. Buccino, R. Díaz, et al. \_

10:50 – 11:15 Coffee break

Session 5 – Grand Minima and Historical Records (Chairs: Alisson Dal Lago, Ilya Usoskin)

11:15 – 11:45 Invited Talk – *Stars in Magnetic Grand Minima: Where Are They and What Are They Like?* Steven Saar \_

11:45 – 12:00 Contributed Talk – *Soft X-ray Emission as Diagnostics for Maunder Minimum Stars* Katja Poppenhäger, J.H.M.M. Schmitt \_

12:00 – 12:15 Contributed Talk – *Is the Small-scale Quiet Sun Dynamo a Pedestal for Solar (and Stellar) Activity?* Karel Schrijver \_

12:15 – 12:35 Solicited Talk – *Interplanetary Space Weather and Space Climate Prediction: Opportunities* Madhulika Guhathakurta

12:35 – 14:30 Lunch break

14:30 Excursion followed by Conference Dinner

## Friday 7 October

Session 5 – Grand Minima and Historical Records (Chairs: Alisson Dal Lago, Ilya Usoskin)

9:00 – 9:30 Invited Talk – *Dynamo Models of Grand Minima* Arnab R. Choudhuri \_

9:30 – 9:50 Solicited Talk – *A Simple Dynamo Model for Grand Minima and Geomagnetic Reversals* Dmitry Sokoloff, G. Sobko, V. Trukhin, V. Zadov \_

9:50 – 10:05 Contributed Talk – *Is Meridional Circulation Important in Modeling the Irregular Solar Cycle?* Bidya Karak, A.R. Choudhuri \_

10:05 – 10:35 Invited Talk – *Grand Minima of Solar Activity on Long-term Scales* Ilya Usoskin, S.K. Solanki \_

10:35 – 10:50 Contributed Talk – *Geomagnetic Storms and Solar Activity since 1806* Volker Bothmer, E. Bosman \_

10:50 - 11:15 Coffee break

11:15 – 11:45 Invited Talk – *Historical Records of Solar Grand Minima: A Review* José Vaquero \_

11:45 - 12:15 Invited Talk - *Does Solar Activity Affect Climate?* Blanca Mendoza \_

12:15 – 12:45 Invited Talk - *Effects of Solar Variability on Planetary Plasma Environments and Habitability* César Bertucci \_

12:45 – 13:00 Contributed Talk – *EV-Lac as a Potential Host for Habitable Planets* Ximena Abrevaya, E. Cortón, P. Mauas

13:00 – 14:30 Lunch break

14:30 – 15:00 Invited Talk - *Variations of Solar and Cosmic Ray Cycles at the Maunder Minimum* Hiroko Miyahara, Y. Yokoyama, Y.T. Yamaguchi, et al. \_

Discussion and Summary (Chair: Cristina Mandrini)

15:00 – 16:00 Discussion led by Karel Schrijver *Can We Establish if We Are Entering a Grand Minimum, and to Whom would that Matter?* \_

16:00 – 16:15 Publication Plans - Meeting Summary Cristina Mandrini & David Webb – Hebe Cremades & Sarah Gibson

17:30 - 18:30 Public Outreach Talk - *Global Warming: Greenhouse Effect or Solar Activity?* - *Calentamiento Global: ¿Efecto Invernadero o Actividad Solar?* Pablo Mauas (the talk will be given in Spanish)

Poster Contributions

S2 – P1 *Solar Grand Minima and On-Off Intermittent Dynamo* Abraham C.-L. Chian, A. Brandenburg, M.R.E. Proctor, E.L. Rempel

S2 – P2 *Plasma Flow vs. Magnetic Feature Tracking Speeds in the Sun* G. Guerrero, Matthias Rheinhardt, A. Brandenburg, M. Dikpati

S2 – P4 *Creating a database and Analysis of Sunspots at the Solar Observatory of Ica National University in Peru* Lurdes Martínez Meneses, M. Ishitsuka, J. Ishitsuka, H. Trigo



- S3 – P5 *Study of Ground Cosmic Ray Periodicities during Solar Minimum Using the Multidirectional Muon Detector at the Southern Space Observatory* Alisson Dal Lago, L. Ramos Vieira, N.J. Schuch, N.R. Rigozo
- S3 – P7 *Observations of Coronal Holes during Two Solar Minima* Heidy Gutiérrez, L. Taliashvili
- S3 – P8 *Coronal Mass Ejection Deflection in the Corona during the Last Two Solar Minima* Fernando M. López, H. Cremades, L. Balmaceda
- S3 – P9 *A Cellular Automaton Model for Coronal Heating* Marcelo López Fuentes, J.A. Klimchuk
- S3 – P10 *Magneto-seismology of Solar Atmospheric Loops in the Solar Minimum* Marialejandra Luna-Cardozo, G. Verth, R. Erdélyi
- S3 – P11 *High Speed Streams in the Solar Wind during the Last Solar Minimum* G. Maris, O. Maris, Constantin Oprea, M. Mierla
- S3 – P12 *Geomagnetic Effects on Cosmic Ray Propagation under Different Conditions* J.J. Masías Meza, X. Bertou, Sergio Dasso
- S3 – P13 *Forbush Decreases not Related to Transient Solar Events* Guadalupe Muñoz Martínez, J.F. Valdés Galicia
- S3 – P14 *The 3D Solar Corona Cycle 24 Rising Phase from SDO/AIA Tomography* Federico Nuevo, A.M. Vásquez, R.A. Frazin, Zhenguang Huang, W.B. Manchester
- S3 – P15 *Earth-directed Coronal Mass Ejections and their Geoeffectiveness during the 2007 – 2010 Interval* Constantin Oprea, M. Mierla, G. Maris
- S3 – P16 *Evolution of a Very Complex Active Region during the Decay Phase of Cycle 23* Mariano Poisson, M. López Fuentes, C.H. Mandrini, et al.
- S3 – P17 *Cosmic Ray Particles Behavior during the Last Solar Minimum* Marlos Rockenbach Da Silva, A. Dal Lago, W.D. González, et al.
- S3- P18 *Radio Signatures Associated with the Origin of LASCO/STEREO CMEs* Carolina Salas Matamoros, L. Taliashvili
- S3- P19 *Very Intense Geomagnetic Storms: Solar Sources, Characteristics and Cycle Distribution* Natalia Szajko, G. Cristiani, C.H. Mandrini, A. Dal Lago
- S3 – P20 *A Solar Station in Ica: A Research Center to Improve Education at the University and Schools* Raul Terrazas Ramos, M. Ishitsuka, J. Ishitsuka, H. Trigo
- S4 – P21 *Solar Radius and Limb Brightening Variability in the Submillimetric Range* Laura A. Balmaceda, A. Válio, C.L. Selhorst
- S4 – P22 *A Statistical Analysis of the  $H\alpha$  –  $Ca II K$  Relation for Solar Type Stars of Different Activity Levels* A.P. Buccino, Mariela C. Vieytes, P.J.D. Mauas
- S4 – P23 *Determination of the Effective Temperature from  $H\alpha$  Spectral Line Analysis of Solar Type Stars* Deysi Cornejo Espinoza, I. Ramírez, P. Barklem, W. Guevara Day
- S4 – P24 *Calibrating the Sun-as-a-star: Using Hinode XRT to Measure Stellar Coronae* Steven H. Saar, P. Testa
- S5 – P25 *Potential Energy Stored by Planets and Grand Minima Events* Rodolfo Cionco
- S5 – P26 *A new Imminent Grand Minima?* Rodolfo Cionco, R.H. Compagnucci
- S5 – P27 *Long-term Relation between Sunspot Activity and Surface Temperature at Different Geographical Regions* M.P. Souza Echer, Ezequiel Echer, W.D. González, et al.
- S5 – P28 *Parallels among the “Music Scores” of Solar Cycles, Space Weather and Earth’s Climate* Z. Kolláth, K. Oláh, Lidia van Driel-Gesztelyi
- S5 – P29 *TTVs Detection in Southern Hemisphere Stars* Romina Petrucci, A.P. Buccino, E. Jofré, et al.
- S5 – P30 *Climate Interaction Mechanism between Solar Activity and Terrestrial Biota* Jaime Osorio Rosales, B. Mendoza Ortega

S5 – P31 *The Coronae of Ca II HK-selected Magnetic Grand Minima Candidate Stars* Steven H. Saar, P. Testa

Late Posters

S3 – P32 *Seeing Measurement at Sasahuine Mountain, Moquegua, Peru* M. Huamán, W.

Guevara Day, E. Meza, J. Samanes, P. Becerra, Cristian Ferradas

S3 – P33 *Installation and Operation of the Water Cherenkov Detector for the Large Aperture GRB Observatory (LAGO)* L.J. Otiniano Ormachea, Edith Tueros Cuadros, W. Guevara Day (LAGO collaboration)

## Scientific Organizing Committee

Hebe Cremades (Argentina, Co-chair)

Sarah Gibson (USA, Co-chair)

Tom Ayres (USA)

Alisson Dal Lago (Brazil)

Daniel Gomez (Argentina)

Manuel Guedel (Austria)

Gustavo Guerrero (Sweden)

Jeffrey Hall (USA)

Margit Haberreiter (Switzerland)

Joanna Haigh (UK)

Kanya Kusano (Japan)

Cristina Mandrini (Argentina)

Georgeta Maris (Romania)

Valentin Martinez Pillet (Spain)

Andrey Tlatov (Russia)

Ilya Usoskin (Finland)

Adriana Valio (Brazil)

## Local Organizing Committee

Cristina Mandrini (IAFE, UBA-CONICET, Buenos Aires, Argentina, Chair)

Laura Balmaceda (ICATE and UNSJ, San Juan, Argentina )

Hebe Cremades (UTN and CONICET, Mendoza, Argentina)

German Cristiani (IAFE, UBA-CONICET, Buenos Aires, Argentina)

Sergio Dasso (IAFE, UBA-CONICET, and Dept. of Physics, FCEN, Buenos Aires, Argentina)

Marcelo Lopez Fuentes (IAFE, UBA-CONICET, Buenos Aires, Argentina)

Maria Luisa Luoni (IAFE, UBA-CONICET, Buenos Aires, Argentina)

## List of participants

	A	B	C	D	E
1	Order	Name	Affiliation	Country	Gender
2	1	Ximena Abrevaya	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	F
3	2	Laura Balmaceda	Instituto de Ciencias Astronómicas, de la Tierra y del Espacio - ICATE	Argentina	F
4	3	Inez Batista	Instituto Nacional de Pesquisas Espaciais – INPE	Brazil	F
5	4	César Bertucci	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	M
6	5	Volker Bothmer	Institute for Astrophysics University of Göttingen	Germany	M
7	6	Axel Brandenburg	Nordic Institute for Theoretical Physics - Nordita	Sweden	M
8	7	Matthew Browning	CITA - University of Exeter	U.K.	M
9	8	Allan Sacha Brun	CEA – Saclay	France	M
10	9	Simon Candelaresi	Nordic Institute for Theoretical Physics - Nordita	Sweden	M
11	10	Abraham Chian	Paris Observatory - Meudon	France	M
12	11	Arnab Choudhuri	Indian Institute of Science	India	M
13	12	Rodolfo G. Cionco	Universidad Tecnológica Nacional Fac. Regional San Nicolás	Argentina	M
14	13	Edward Cliver	Air Force Research Laboratory	U.S.A.	M
15	14	Deysi V. Cornejo Espinoza	Comisión Nacional de Investigación y Desarrollo Aeroespacial – CONIDA	Perú	F
16	15	Pedro Corona Romero	Instituto de Geofísica – UNAM	México	M
17	16	Hebe Cremades	Universidad Tecnológica Nacional Fac. Regional Mendoza	Argentina	F
18	17	Maximiliano Crescitelli	Universidad Tecnológica Nacional Fac. Regional Mendoza	Argentina	M
19	18	Germán Cristiani	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	M
20	19	Alisson Dal Lago	Instituto Nacional de Pesquisas Espaciais – INPE	Brazil	M
21	20	Sergio Dasso	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	M
22	21	Giuliana de Toma	High Altitude Observatory – National Center for Atmospheric Research	U.S.A.	F
23	22	Fabio del Sordo	Nordic Institute for Theoretical Physics - Nordita	Sweden	M
24	23	Marc DeRosa	Lockheed Martin Solar and Astrophysics Laboratory	U.S.A.	M
25	24	Ezequiel Echer	Instituto Nacional de Pesquisas Espaciais – INPE	Brazil	M
26	25	Yvonne Elsworth	School of Physics and Astronomy University of Birmingham	U.K.	F

	A	B	C	D	E
27	26	Cristian Ferradas Alva	Comisión Nacional de Investigación y Desarrollo Aeroespacial – CONIDA	Perú	M
28	27	Romina García	Universidad Nacional de San Juan	Argentina	F
29	28	Mark Giampapa	National Solar Observatory – NOAO	U.S.A.	M
30	29	Sarah Gibson	High Altitude Observatory – National Center for Atmospheric Research	U.S.A.	F
31	30	Daniel Gómez	Departamento de Física, FCEN Universidad de Buenos Aires	Argentina	M
32	31	Walter González	Instituto Nacional de Pesquisas Espaciais – INPE	Brazil	M
33	32	Gustavo Guerrero	Nordic Institute for Theoretical Physics - Nordita	Sweden	M
34	33	Madhulika Guhathakurta	Heliophysics Division NASA Headquarters	U.S.A.	F
35	34	Heidy Gutiérrez	Centro de Investigaciones Espaciales Universidad de Costa Rica	Costa Rica	F
36	35	Margit Haberleiter	Physikalisch-Meteorologisches Observatorium Davos – WRC	Switzerland	F
37	36	Neal Hurlburt	Lockheed Martin Advanced Technology Center	U.S.A.	M
38	37	Francisco Iglesias	Universidad Tecnológica Nacional Fac. Regional Mendoza	Argentina	M
39	38	Emre Isik	Istanbul Kultur University	Turkey	M
40	39	Bidya B. Karak	Indian Institute of Science	India	M
41	40	Heidi Korhonen	Niels Bohr Institute University of Copenhagen	Denmark	F
42	41	Jon Linker	Predictive Science Inc.	U.S.A.	M
43	42	Jeffrey Linsky	Joint Institute for Laboratory Astrophysics - University of Colorado	U.S.A.	M
44	43	Ramón López	Department of Physics University of Texas at Arlington	U.S.A.	M
45	44	Fernando López	Universidad Nacional de San Juan	Argentina	M
46	45	Marcelo López Fuentes	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	M
47	46	Janet Luhmann	Space Sciences Laboratory University of California, Berkeley	U.S.A.	F
48	47	Marialejandra Luna Cardozo	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	F
49	48	María Luisa Luoni	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	F
50	49	Cristina H. Mandrini	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	F
51	50	Lurdes Martínez Meneses	Universidad Nacional San Luis Gonzaga de Ica	Perú	F
52	51	Pablo Mauas	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	M
53	52	Blanca Mendoza Ortega	Instituto de Geofísica – UNAM	México	F
54	53	Hiroko Miyahara	The University of Tokyo	Japan	F
55	54	Kazuoki Munakata	Physics Department Shinshu University	Japan	M
56	55	Andrés Muñoz Jaramillo	Harvard-Smithsonian Center for Astrophysics	U.S.A.	M

	A	B	C	D	E
57	56	Dibyendu Nandi	Indian Institute of Science, Education and Research, Kolkata	India	M
58	57	Federico Nuevo	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	M
59	58	Constantin Oprea	Institute of Geodynamics Romanian Academy	Romania	M
60	59	Jaime A. Osorio Rosales	Instituto de Geofísica – UNAM	México	M
61	60	Romina Petrucci	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	F
62	61	Mariano Poisson	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	M
63	62	Katja Poppenhaeger	Hamburg Observatory	Germany	F
64	63	Eric Priest	St. Andrews University	U.K.	M
65	64	Matthias Rheinhardt	Nordic Institute for Theoretical Physics - Nordita	Sweden	M
66	65	Marlos Rockenbach da Silva	Universidade do Vale do Paraíba UNIVAP	Brazil	M
67	66	Jenny M. Rodríguez Gómez	Observatorio Astronómico Nacional Universidad Nacional de Colombia	Colombia	F
68	67	Eugene Rozanov	Physikalisch-Meteorologisches Observatorium Davos – WRC	Switzerland	M
69	68	María Emilia Ruiz	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	F
70	69	Steven Saar	Smithsonian Astrophysical Observatory	U.S.A.	M
71	70	Carolina Salas Matamoros	Centro de Investigaciones Espaciales Universidad de Costa Rica	Costa Rica	F
72	71	Jürgen Schmitt	Hamburger Sternwarte	Germany	M
73	72	Werner Schmutz	Physikalisch-Meteorologisches Observatorium Davos – WRC	Switzerland	M
74	73	Karel Schrijver	Lockheed Martin Advanced Technology Center	U.S.A.	M
75	74	Caius Selhorst	Universidade do Vale do Paraíba UNIVAP	Brazil	M
76	75	Dmitry Sokoloff	Moscow State University	Russia	M
77	76	Raphael Steinitz	Ben Gurion University	Israel	M
78	77	Leif Svalgaard	Stanford University	U.S.A.	M
79	78	Natalia S. Szajko	Instituto de Astronomía y Física del Espacio - IAFE	Argentina	F
80	79	Lela Taliashvili	Centro de Investigaciones Espaciales Universidad de Costa Rica	Costa Rica	F
81	80	Raúl Terrazas Ramos	Universidad Nacional San Luis Gonzaga de Ica	Perú	M
82	81	Michael Thompson	High Altitude Observatory – National Center for Atmospheric Research	U.S.A.	M
83	82	Andrey Tlatov	Kislovodsk Mountain Astronomical Station – Pulkovo Observatory	Russia	M
84	83	Ilya Usoskin	Department of Physics University of Oulu	Finland	M
85	84	Adriana Válio	CRAAM - Mackenzie University	Brazil	F
86	85	Lidia van Driel-Gesztelyi	Konkoly Observatory	Hungary	F

	A	B	C	D	E
87	86	José Vaquero	Universidad de Extremadura	España	M
88	87	Bernardo Vargas	Instituto de Geofísica – UNAM	México	M
89	88	Alberto Vásquez	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	M
90	89	Mariela C. Vieytes	Instituto de Astronomía y Física del Espacio – IAFE	Argentina	F
91	90	Joern Warnecke	Nordic Institute for Theoretical Physics - Nordita	Sweden	M
92	91	David Webb	Institute of Scientific Research Boston College	U.S.A.	M
93	92	Nadezhda Zolotova	St. Petersburg State University	Russia	F
94	93	Francesco Zuccarello	Centrum voor Plasma-Astrofysic KU Leuven	Belgium	M

## Scientific summary and highlights of the meeting

IAU Symposium 286, "Comparative Magnetic Minima: Characterizing Quiet Times in the Sun and Stars", was coordinated through Division II, with the strong support of Division IV, including several of their associated commissions. It was held in Mendoza, Argentina from 3 to 7 October 2011. The symposium attracted scientific experts on the various topics pertinent to the meeting from all over the world. The goal of IAU Symposium 286 was to consider solar and stellar minima, from generative dynamo mechanisms to in-depth analyses from Sun to Earth for recent well-observed and modeled minima, to a range of stellar cyclic activity, to outlier "grand minima". Solar, heliospheric, geospace, atmospheric, stellar, and planetary sciences were included in the meeting's scope.

Solar and stellar minima represent times of low magnetic activity and simple helio/asterospheres. They are, thus, excellent targets for interdisciplinary, system-wide studies of the origins of stellar variability and consequent impacts on planetary systems. The recent solar minimum extended longer and was "quieter" than any we have observed in the Space Age, inspiring both scientific and public interest. A rich variety of satellite and ground-based observations, in conjunction with theoretical and numerical modeling advances, have allowed us to probe the peculiarities of this minimum as never before. The implications are far-reaching, connecting Earth to Sun to stars, radio to X-ray to cosmic rays, and the plethora of observations of recent minima to the Sun's past behavior as preserved in cosmogenic isotopes and historical sunspot and auroral records.

At the meeting, both invited and contributed presentations were given describing how magnetic fields can be cyclically generated in solar and stellar interiors via various dynamo processes. Numerical models have increased in complexity to the point where many observed aspects of the cycles in the Sun and stars are captured, although mysteries remain such as the origins of extended, or "Grand" Minima. Both stellar observations and historical and cosmogenic records at the Earth were presented to form a basis of understanding of such fascinating intervals, and of solar/stellar long-term variability in general. Along the same lines, a simple method to reconcile the Zürich Sunspot Number and the Group Sunspot Number was presented, with important and wide ranging implications towards an agreed upon and vetted single sunspot series for use in the future.

Detailed examination of the recent extended solar minimum revealed that it was the lowest and longest minimum in about a century, having weak polar magnetic fields, a complex corona and heliosphere, and recurrent high-speed streams. Simultaneously, it was found that solar minima do not all look alike, given that the Sun can have different magnetic flux configurations even during very quiet times, yielding distinct 3D magnetic flux distributions and, therefore, diverse structure of the corona and heliosphere. The larger fraction of higher-order harmonic content implicates that the corona is generally far from dipolar, so that the solar wind has many low- to mid-latitude coronal-hole sources. The many boundaries of these sources, including pseudo-streamers (large-scale closed fields that do not overlie the main solar neutral line), contribute with many transients to the solar wind, seen as blobs and other non-explosive features in images and as features with ICME-like characteristics at 1 AU. During this recent minimum, the solar field has achieved a solar maximum-like corona and solar wind source situation but with weak magnetic fields and associated weak heating. The discussed results point out the need for textbooks and solar physics educators to revise the way they describe the solar wind and its sources.

In addition, the recent extended solar minimum provoked discussions on the possibility of a trend in the Sun's current magnetic cycles towards a Grand Minimum, and the potential implications for the Earth's climate. For instance, there is evidence that a strong decrease of the solar activity can lead to a delay of ozone recovery, partially compensating greenhouse warming, and that irradiance variability is the most important forcing for global problems. A combination of the bottom-up and top-down models seems appropriate for the radiative solar forcing of the atmosphere. The phase shift between the solar radiative forcing of surface climate and the solar cycle, indicated by SORCE measurements, will have an important effect on climate modeling. Although the forcing due to anthropogenic influences is about seven times larger than the radiative solar forcing, it can be assured that solar activity does affect climate, establishing the need for a constrained set of future solar forcings and maintenance, and extension, of all relevant observations.

The question of the origins and implications of cyclic behavior, for the Sun-Earth system and also for other stellar-planetary systems, was the subject of several presentations. For instance, it was shown that induced magnetospheres, such as that of Venus, directly interact with the solar wind and, therefore, are more prone to atmospheric evolution than intrinsic magnetospheres. Venus plasma regions and escape rates seem to be strongly influenced by the solar cycle and by the solar wind pressure. On the other hand, Mars boundaries do not appear to be so dependent on the solar cycle phase, though simulations suggest that the escape rate is. Current estimations of the escape rates are of the order of 10<sup>25</sup> particles per second, but these estimates may double and even increase by an order of magnitude during stormy space weather. The role of the exosphere in the interaction needs to be further assessed.

This symposium was undoubtedly unique in the sense that it brought a diverse group of scientists that were able to take part in discussions, appreciate the scientific disciplines of others, and discover the common aspects of the physical processes involved in the different studied environments from Sun to Earth, and stars to planets.

The Symposium SOC was chaired by Sarah Gibson and Hebe Cremades, the LOC by Cristina Mandrini, and the editors of the Proceedings are Cristina Mandrini and David Webb.