

DIVISION B

FACILITIES, TECHNOLOGIES AND DATA SCIENCE

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DIVISION B COMMISSIONS

Commission B1

Computational Astrophysics

Commission B2

Data and Documentation

Commission B3

Astroinformatics and Astrostatistics

Commission B4

Radio Astronomy

Commission B5

Laboratory Astrophysics

Commission B6

Astronomical Photometry and Polarimetry

Commission B7

Protection of Existing and Potential Observatory Sites

[Inter-Division with Div. C]

DIVISION B WORKING GROUPS

Division B WG

Time Domain Astronomy

Division B WG

UV Astronomy

Division B WG

Virtual Observatory

INTER-DIVISION WORKING GROUPS

Inter-Division B-E WG

Coordination of Synoptic Observations of the Sun

TRIENNIAL REPORT 2021-2024

1. Background

Division B at present is the largest IAU Division with 4343 active members and 401 junior members. Participating Commissions are seven including the Inter-Division B-C Commission Protection of Existing and Potential Observatory Sites. One more participating Commission is the Inter-Division B-H-J Commission on the Intergalactic Medium.

Division B Facilities, Technologies and Data Science reflects the necessity of modern

astronomical research to put together a rich mixture of technology, systems, processes deployed and operated on the ground and in space with Science. In our Commissions the Technical developments are always compared and discussed at the light of their utility to the Science requests. Science and Technical developments have to go together. High performance computing and information technology have become a key component of that mix. The large number of Commissions and Commission WGs reflects the utility to focalize important topics to be developed.

The main Technical and Scientific results have been presented in Commission and WG reports; Reports will appear at dedicated pages on the IAU web site:

https://www.iau.org/publications/iau/commission_reports/

https://www.iau.org/publications/iau/wg_reports/

Only a short note to remind that in the 2021-2024 triennium COVID-19 strongly affected also astrophysical activities with many meetings cancelled or organized in remote. The IAU GA was postponed from 2021 to 2022.

2. Division Activity within the 2021-2024 triennium

2.1. 2021-2022

Starting from August 2021, the new SC started a review of Division and Commission WGs with the aim to remove inactive WGs and to add new WGs, to increase the interaction between IAU Division B and various scientific activities. A few WGs became 'Functional' WGs.

During the first half of 2022 the main job of Division B SC was to organize the Division B days at the IAU GA in August 2022. WGs were invited to organize scientific sessions on their activity. Six sessions were organized in parallel mode: New Facilities and Growing Archives; History of Radio astronomy in Eastern Asia; Laboratory Astrophysics; The Global VLBI Alliance; Laboratory Astrophysics Databases: from the provider to the user: encouraging FAIRness; UV photometry planning for the future.

After a plenary session the six sessions were scheduled in parallel mode for a total of 48 oral contributions and 10 e-talks; in more detail, this was the program: Plenary Session: P. Benvenuti presented the new IAU Center for the Protection of Dark and Quiet Sky from Satellite Constellations Interference (CPS); the PhD Prize winners of the last 4 years presented and discussed their scientific results: Francisco J.B. Martinez - Spectropolarimetric and imaging properties of Fabry-Pérot etalons; Danna Qasim - Laboratory studies of interstellar methane ice in the era of JWST; Luke Pratley - Exact wide-field interferometric imaging via distributed sparse image reconstruction; and Niels Ligterink - The astrochemical factory: Producing the first biomolecule building blocks.

In the New Facilities and Growing Archives session the following topics were presented: highlights of important developments in the field of Computational Astrophysics (Commission B1) and first results and properties of new relevant telescopes: the Iranian National Observatory 3.4m optical telescope, the FAST radio telescope in China, and the Imaging X-ray Polarimeter Explorer (IXPE). In addition there was a presentation discussing problems related to the SKA data reduction and presenting important results from the SKA precursor ASKAP. Virtual Observatory (VO) science was introduced and problems/solutions related to the rapidly increasing satellite pollution in radio and optical bands was discussed.

In the History of Radio Astronomy in Eastern Asia sessions, coordinated by the WGHRA, the radio astronomy developments in the Republic of Korea, Japan, Taiwan and China were presented. Commission B5 (Laboratory Astrophysics) presented and dis-

cussed its activity in Korea, South America, Japan, the US and Europe with contributions from local people. The working group The Global VLBI Alliance presented talks on major VLBI arrays: EVN, VLA/ngVLA, LBA, EAVLBI and invited astronomers to join the GVA Science Forum. The International Virtual Observatory Activity was discussed and main principles were presented. The UV working group discussed UV photometry, approved standards and their implementation.

These sessions had a large number of people attending in person and remote. A relatively large amount of time was devoted to discuss the past and future activity, in particular the possibility to organize international meetings on the most interesting topics that were brought.

2.2. 2022-2023

To increase the Division activity the SC contacted all Division members to encourage applications for Focus meetings and Symposia in 2024 on topics related to the various Division activities. The SC was available to provide preliminary comments to the drafts of LoIs received. Thanks to this activity Div. B was involved in 10 applications for a IAU Symposium (3 as coordinating Division) and in 19 applications (7 as coordinating Division) for a Focus meeting at the 2024 GA. All proposals were discussed between the PI of the proposal and members of the Division SC. A support letter was sent to the PIs. Finally Division ranked the submitted proposals.

One more SC activity was the selection of the IAU PhD prize

The SC supported the participation from Division B members, to the Asia Pacific Regional IAU Meeting 2023. Since the previous regional meeting in 2020 was cancelled because of COVID, this APRIM 2023 provided a great opportunity for researchers to restart to interact with others and create or renew networks. A SC member collaborated with the SOC.

2.3. 2023-2024

Main activities (still in progress) are:

- IAU elections of OC Commission members, SC Division members and VPs. All Division members were contacted to find interested people to stand for elections. In a few cases the number of candidates was too low with respect to available positions and the SC selected possible candidates to be contacted to obtain their willingness to apply.
- Triennial Activity. Working Groups, Commissions and the Division SC discussed the activity of the last triennium. It was decided that the next Division SC will investigate the activity of WGs to remove inactive ones and to eventually create new WGs. As a first step of a better organization the UV WG submitted a proposal for the creation of a Commission on Space Astronomy. This proposal was approved by the SC and submitted to the IAU EXEC. We expect it will be approved at the 2024 General Assembly.
- 2024 IAU General Assembly: During the first half of 2024 Division B SC discussed how to organize Division days at the GA. In the first session, after the presentation of the 2022 and 2023 IAU PhD winners in our Division, a Plenary Discussion was scheduled to present new Presidents of the Division and Commissions and new members in the SC and OC. A discussion of the future activity is expected.

The other sessions will be dedicated to scientific and technical topics of interest to the Division activity but not discussed in other meetings (Symposia and Focus). The second session will be dedicated to the high energy: Neutrino detectors and astrophysics and the Cherenkov Telescope Array. The third session will have two parallel meetings: the Habitable Worlds Observatory (HWO) and Open Science and the Virtual Observatory. The fourth session will discuss different topics as the Lunar International Observatory,

Polarimetry, the UltraViolet Transient Astronomy Satellite and the large scale time-domain photometric survey with the LSST. The fifth session will present the last 65 yrs of Radio Astronomy in SA, the MeerKat telescope and the synergy between ngVLA and SKA-Mid. 21 oral contributions (including the 2 PhD presentations) and more than 60 Poster presentations have been accepted.

- 2025 Symposia Selections. 13 proposals for 2025 Symposia were submitted. Division B is the Coordinating Division for one of these (candidate as Kavli Symposium), and it is the Supporting Division for 3 of these. Proposals were discussed and evaluated and results submitted to the EC.

Gabriele Giovannini
President of the Division B