

## **DIVISION G / WORKING GROUP ABUNDANCES IN RED GIANTS**

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BOARD**

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### **TRIENNIAL REPORT 2016-2018**

#### **1. Introduction**

The Working Group on Abundances in Red Giants was established over two decades ago, to draw the attention to the intricate processes inside cool giant stars that, together, determine not only the stellar nucleosynthesis and internal mixing but also, through mass loss, the enrichment of the interstellar medium. Scientists from disciplines as remote as hydrodynamical simulations and meteoritic composition worked together on this hugely ambitious topic. Hundreds of astronomers have been, and remain active in this broad field, resulting in numerous publications and several relevant conferences.

#### **2. Developments within the past triennium**

Three years ago, the working group was renewed. A change of name had been proposed, although this was never processed in the higher echelons of the IAU. We acknowledged that the problems our community were trying to solve were not limited to the explanation of abundances in red giants, but also to mass loss, stellar populations, and one of the greatest embarrassments in science – convection, among others. We had therefore decided that a more accurate name – namely, the Working Group on Red Giants and Supergiants – would better encompass the rich variety in inter-related aspects of the evolution of red giants and their more massive siblings, red supergiants.

An ongoing activity of the working group has been the compilation and distribution of the “AGB Newsletter”, which is announced by email at the start of each month to about 2000 researchers all over the world. Each issue contains around thirty abstracts of new publications and announcements concerning conferences and job openings of interest to the diverse AGB community. First ascent and red supergiant branches are just as asymptotic as the AGB is! A “Food for Thought” item has been included to provoke thought and discussion, which is addressed in the next editorial. Besides merely a platform for communication, it has been effective in defining and holding together a large group of astronomers from diverse fields and numerous countries. The editorial team actively approach authors of papers appearing on arXiv, that are deemed of relevance to the red giant and supergiant star community.

Evidence of the productivity of researchers working under this banner comes in the form of a series of high impact results coming from several teams: on the resolved images of AGB stars and red supergiants and their envelopes; on the seismology of the interiors of red giant branch stars; on the mass loss and dust production of red giants of all masses and the properties of red supergiants as supernova progenitors. A lot of hard work is going on

to bring more sophistication and power in the three-dimensional magnetohydrodynamical modelling of the interiors of these stars, and in the treatment of the convective boundaries and their effect on nucleosynthesis, stellar structure and evolution.

Members of the WG on Abundances in Red Giants helped organise a series of conferences held in Vienna under the title “Why Galaxies Care About AGB Stars”, designed to bring together researchers in stellar nucleosynthesis with those working on the chemical evolution of galaxies. The proceedings of the first three of these successful conferences, held in 2006, 2010 and 2014, have been published in the ASP Conference Series. The fourth conference of the series has been approved as IAU Symposium 343 and will be held, again in Vienna, during the 2018 General Assembly.

### 3. Proposal for the next triennium

That said, we thus propose that the working group continue, under the new name of “IAU Working Group on Red Giants and Supergiants”. Most of the board’s members have agreed to continue to serve, but we have both the space and the desire to seek new members to complement the expertise, to draw in both the wisdom obtained over long careers as well as the fresh ideas brought in by emerging talent, all the while assuring a healthy balance of human diversity. We realise the importance to actively engage with the community.

As one of the core activities of this working group we are committed to continue the monthly issue of the “AGB Newsletter” as its communiqué. We intend to explore ways of more effective interaction with an audience as large as possible, through the newsletter and possibly other means. The newsletter and several inter-disciplinary workshops have been making inroads on getting researchers that were traditionally working in disparate fields to work together on problems at the boundaries of these fields. But more can – and needs to – be done in that regard. The working group’s organizing committee shall become an editorial board of the newsletter, to provide ideas and direction and to strengthen the links within the diverse AGB community and between it and the IAU.

Our first task (after broadening our board membership) we set ourselves for the new triennium will be the identification of core questions that need an answer; the implications of possible answers; and a strategy for making progress on finding such answers. Topics that are likely to be among these include, but are not limited to, convection and other mixing processes, magnetic fields, rotation, pulsation, winds, dust formation and the observational inference from population studies. The newsletter will be used to solicit input from the wider community.

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