

DIVISION VI / COMMISSION 24 / WORKING GROUP PLANETARY NEBULAE

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TRIENNIAL REPORT 2009-2011

1. Introduction

The aims of this Working Group are:

- To ensure that scientific symposia on planetary nebulae take place regularly, ideally every 5 years. These symposia would preferably be sponsored by the IAU;
- To organize and coordinate the Joint Discussions on the subject at the IAU General Assemblies. These discussions should address topics of interest not only to our Division VI but to other Divisions as well; and
- To maintain a Web page with general information about the WG, the activities related to planetary nebulae, and the future meetings and symposia.

2. Meetings and Conferences

- IAU Symposium 283, “Planetary Nebulae: an Eye to the Future” Puerto de La Cruz, Tenerife, Spain, 25-29 July 2011, <http://www.iac.es/congreso/iaus283/>
- “Asymmetric Planetary Nebulae V”, Lake District, United Kingdom 20-25 June 2010, <http://www.jodrellbank.manchester.ac.uk/meetings/APN5/>
- “Towards understanding Asymmetric Planetary Nebulae: strategic research collaboration”, Rochester NY 17-19 June 2009, http://www.pas.rochester.edu/~afrank/Pn_Meeting_Page.htm
- “Legacies of the Macquarie/AAO/Strasbourg H α Planetary Nebula project”, February 16-18th 2009, Sydney, Australia <http://www.physics.mq.edu.au/astronomy/mash-workshop/>

3. Proceedings and Monographs

3.1. Conference Proceedings

- IAU Symposium 283, “Planetary Nebulae: an Eye to the Future”, 2012, (ed. A. Manchado, L. Stanghellini, D. & D. Schönberner, eds.) (in press)
- Asymmetric Planetary Nebulae V, ed. A. Zijlstra, F. Lykon, E. Lgadec and I. McDonald <http://www.jodrellbank.manchester.ac.uk/meetings/APN5/proceedings.html>

4. Developments within the past triennium

The Working Group on Planetary Nebulae (PNWG) planned and organized the IAU Symposium 283, “Planetary Nebulae: an Eye to the Future”, <http://www.iac.es/congreso/iaus283/> that took place on July 25-29 2011 at Puerto de la Cruz of 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. This meeting followed the time-honored tradition of having an IAU symposium on planetary nebulae every 5 years. The symposium proceedings are edited by A. Manchado, L. Stanghellini and D. Schoenberner. The main topics of the Symposium were: new results from observations; the stellar evolutionary connection; aspects of the planetary nebula phase; the central stars; the population of Galactic, extragalactic, and intra-cluster planetary nebulae; and future endeavours in the field.

Some of the PNWG members have been organizing interim meetings in the field of planetary nebulae. Albert Zijlstra, Romano Corradi and Alberto López organized the “Asymmetrical Planetary Nebulae V” conference, in June 2010, held in Bowness-on-Windermere, UK. (<http://www.astrophysics.manchester.ac.uk/apn5.html>)

Adam Frank organized the workshop “Towards understanding Asymmetric Planetary Nebulae: strategic research collaboration”, in June 2009, in Rocherter, NY, USA http://www.pas.rochester.edu/~afrank/Pn_Meeting_Page.htm

Quentin Parker, organized the workshop “Legacies of the Macquarie/AAO/Strasbourg H α Planetary Nebula Project”, in February 2009, in Sydney, Australia <http://www.physics.mq.edu.au/astronomy/mash-workshop/>

The SFWG webpage (<http://www.iac.es/proyecto/PNgroup/wg/index.html>) is maintained and updated with links to past and forthcoming meetings on PNe, and useful databases related with the PN field can also be found there. It has recently been updated with the “Kinematic Catalogue of Galactic Planetary Nebulae” consisting of high-resolution ($6 - 11.5 \text{ km s}^{-1}$) spectra for about 600 planetary nebulae.

5. IAU reorganization

During the last IAU Symposium 283, the PNWG held a business meeting, where the members voted in great majority to request an upgrade to an IAU Commission. The reasons are as follows: Our WG has been very active over the last 44 years, having organized eight IAU Symposia. Research on PNe has undergone vigorous growth in recent years, the number of published papers has more than doubled in the last 5 years. There has been an impressive diversity in scientific topics and observational techniques in PN research. In addition, PNe consist of material ejected by intermediate- and low-mass stars. The formation of PNe is in many ways similar to the formation of ring nebulae around massive stars, such as Wolf-Rayet (WR) stars and luminous blue variables (LBVs). Both PNe and ring nebulae around WR stars contain hot, X-ray-emitting plasma originating

from shocked fast stellar winds. In fact, researchers who study WR ring nebulae and LBV nebulae frequently study PNe as well, as the study of these objects leads to a better understanding of their formation and physical conditions.

These objects represent the stellar material returned into the ISM, yet they are still closely associated with their central stars. Researchers of circumstellar nebulae have very little overlap with Commission 34 members who study the ISM in general.

Therefore, the PNWG proposed to upgrade the PNWG to an IAU Commission of “Circumstellar Nebulae” to include both PNe and ejecta nebulae around massive stars within the current Division VI or future Division H of the IAU.

Arturo Manchado
Chair of the Planetary Nebulae Working Group