The AGB-Supernovae mass transition

Monte Porzio Catone, March 27-31, 2017

Scientific Organizing Committee

Inma Dominguez (University of Granada, Spain),
Sylvia Ekstrom (University of Geneva, Switzerland),
Martin Groenewegen (Royal Observatory of Belgium),
Zhanwen Han (Yunnan Observatories, China),
Amanda Karakas (co-chair) (Monash University, Australia),
Chiaki Kobayashi (University of Hertfordshire, United Kingdom),
Rubina Kotak (Queen's University, United Kingdom),
Ken'ichi Nomoto (University of Tokyo, Japan),
Paolo Ventura (co-chair) (INAF - Observatory of Rome, Italy),
Patricia Whitelock (South African Astronomical Observatory and University of Cape Town),
Lev Youngelson (Institute of Astronomy RAS, Russia),

Local Organizing Committee

Giuliana Giobbi (INAF - Observatory of Rome),
David Brown (Vatican Observatory),
Marco Castellani (INAF - Observatory of Rome),
Flavia Dell'Agli (Instituto de Astrofisica de Canarias, Tenerife),
Marcella Di Criscienzo (INAF - Observatory of Rome),
Vincenzo Testa (INAF - Observatory of Rome),
Paolo Ventura (INAF - Observatory of Rome),

Sponsorship

Observatory of Rome
INAF - Istituto Nazionale di Astrofisica
Vatican Observatory
ARAP - Associazione Romana per le Astro-Particelle

FOREWORD

In recent years we have witnessed a growing interest in stars in the mass range at the edge between experiencing asymptotic giant branch (AGB) evolution or undergoing a supernova explosion. The final fate of these objects depends on a series of complex physical phenomena, primarily the rate of mass-loss, which determines whether the core can grow big enough to reach the Chandrasekhar mass and explode as an electron-capture supernova (EC-SN). As a members of binary systems, the C-O (or O-Ne) white dwarf cores can grow in mass as a consequence of mass transfer from a companion and may eventually explode as a thermonuclear supernova (SN type Ia).

Significant progress in understanding the evolution of these stars is mandatory to fully assess the role they play in the gas and dust pollution of galaxies. A number of open questions still need to be answered. A few examples are the abundance gradients in galaxies, the role of massive AGB and super-AGB stars in the origin and evolution of globular clusters, and the interpretation of the extinction curves of stellar populations of various complexities and at different redshifts.

The conference *"The AGB-Supernovae mass transition"*, held at the Observatory of Rome, was the occasion to gather scientists active in these fields to stimulate open discussion on these topics. The conference was particularly timely, because impressive progress has been made on the theoretical side, with new models of super-AGB stars and EC-SN, and new observational data on bright evolved stars in galaxies which may reveal the presence of real super-AGB stars. Furthermore, the hunt for supernova in distant galaxies has found possible light curves from electron-capture supernova. In the near future we can expect important results from: a) ongoing spectroscopic programmes of Local Group galaxies, aimed at detecting distinct abundances patterns that have been predicted; b) long-term monitoring from the ground and from from space, to provide insight into the pulsation characteristics and hence into the mass-loss of bright evolved stars; and c) results of Galactic sources observed with ALMA, to infer the detailed history of mass-loss from individual stars.

There were a total of 60 oral presentations and 15 posters. It is a pleasure to thank all of the participants for the high quality of their contributions. The organizers are indebted to Maria Lugaro, Silvia Toonen and Markus Kromer, for organizing a round table on the status of the art of modelling AGB stars and supernovae of different types, and to Patricia Whitelock, Nikos Prantzos and Jacco van Loon, who headed an interesting and stimulating discussion on current and future observations on the fields of research addressed during the meeting.

The conference was also an opportunity to acknowledge the high quality of science from young researchers and students working in the field. The sponsorship of the Vatican Observatory allowed the organizers and a jury headed by Father David Brown, and composed of Dr. Amanda Karakas (Monash University) and Prof. Rubina Kotak (Queen's University), to award Prizes to a junior student/postdoc and to a senior postdoc for praiseworthy contributions to the domain: Dr. Amanda Karakas delivered the senior Prize to Dr. Carlo Abate (University of Bonn), and Father David Brown delivered the junior Prize to Dr. Flavia Dell'Agli (IAC, Tenerife).

The organizers are particularly indebted to Prof. Fabrizio Fiore, Director of the Observatory of Rome, for the logistical and financial support given to the organization of the conference. We also acknowledge the support of Father Guy Consolmagno, Director of the Vatican Observatory, for the sponsorship offered. We give particular thanks to Dr. Giuliana Giobbi, of the Rome Observatory, for the enthusiasm and the efficiency with which she organized the entire event.

Amanda Karakas, Paolo Ventura, Flavia Dell'Agli and Marcella Di Criscienzo