

1st workshop: Astrophysical winds and disks - Similar phenomena in stars and quasars

Platamonas, Greece, September 3-8, 2009

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FOREWORD

The Astrophysical Spectroscopy Teams of National and Kapodistrian University of Athens (Faculty of Physics) and Astrophysical Observatory of Belgrade organized the **1st International Workshop: “Astrophysical winds and disks - Similar phenomena in stars and quasars”**, which was held at Platamonas, Greece, between September 3 and September 8, 2009.

During the workshop, besides the main Session on Astrophysics, there was also a Special Session on History and Philosophy of Astronomy and Physical Sciences.

Besides the members of the two Astrophysical Spectroscopy Teams, which organized the workshop, we invited great scientists from seven different countries in order to discuss about particular problems and to begin future collaborations on subjects of common interest. We considered it essential to meet all in a common place in order to:

1. Discuss about the scientific results of our work until now, in order to organize some common upcoming publications.
2. Discuss about the scientific problems on the spectroscopic study of the ionization gas around Hot Emission Stars and Quasars.
3. Discuss the further development of our collaboration, as well as to start new collaborations with colleagues of other institutes working in the same research field.
4. Present the scientific work of the members of all the participating scientific groups, during the period September 2008 - September 2009.

In the field of **Hot Emission Stars and Quasars**, the Astrophysical Spectroscopy Teams of National and Kapodistrian University of Athens and Astrophysical Observatory of Belgrade have been collaborating since 2003. During our collaboration, we did the following:

1. We tried to explain the origin of DACs phenomenon and we proposed the SACs mechanism in order to explain the complex structure of the observed profiles of many spectral lines that are created in the environment of Hot Emission Stars.
2. We observed that we can detect the same phenomenon in the spectra of Quasars and we proposed that the origin of this phenomenon is the same as in the case of Hot Emission Stars.
3. We constructed a new model (GR model), able to reproduce theoretically the observed complex spectral line profiles (SACs/DACs). In order to do so, we calculated a line function through the solution of the radiation transfer equations.
4. We calculated two new distribution functions (Rotation distribution and Gauss-Rotation distribution).
5. We constructed a first version of software, in order to reproduce the observed spectral lines and to calculate some physical parameters.
6. We applied successfully the GR model in a great number of spectral lines of Hot Emission Stars.
7. We applied successfully the GR model in a great number of spectral lines of Quasars.

The aim of the Session on Hot Emission Stars and Quasars was to discuss current problems in the investigation of absorption and emission lines in spectra of stars and quasars. One of the goals of the Astrophysical Spectroscopy Teams of National and Kapodistrian University of Athens and Astrophysical Observatory of Belgrade, which have been collaborating on this subject, is to find similarities and differences between emitting/absorbing regions of hot emission stars and quasars. There are several open questions which were discussed during the workshop, as e.g.

the applicability of GR model developed by Athens' group to the spectra of quasars with broad absorption lines, the role of winds in quasars and hot stars and their similarities and differences, etc.

During this workshop, in the field of hot emission stars and Quasars, the following propositions for future studies were made:

1. A statistical study of many stars in different ionization potential regions, using the GR model. With the results of this study, we will be able to make a model for all the gaseous areas around hot emission stars (proposition of Prof. E. Danezis, Dr. A. Antoniou and Dr. E. Lyratzi).
2. A study of the time scale variation of all the parameters of some characteristic hot emission stars, using the GR model (proposition of Prof. E. Danezis, Dr. A. Antoniou and Dr. E. Lyratzi).
3. An experimental study in order to verify the existence of density regions of matter able to construct spectral lines (emission or absorption), like the spectral lines that we detect in the spectra of hot emission stars (proposition of Prof. J. Purić, Dr. N. Cvetanović, Prof. B. M. Obradović, Prof I. P. Dojčinović and Prof. M. M. Kuraica).
This program is the subject of the collaboration between the scientific team of Prof. Purić in University of Belgrade and the Astrophysical Spectroscopy teams of the University of Athens and the Observatory of Belgrade.
4. A probabilistic method to extract the exact number of satellite components in which a complex spectral line profile can be decomposed. Through this method, the width and the intensity can also be estimated (proposition of Dr. M. Avlonitis and Dr. A. Pappa).
This program is the subject of the collaboration between the scientific team of Dr. Avlonitis in Ionian University and the Astrophysical Spectroscopy Teams of the University of Athens.
5. A study of the physical parameters of many spectral lines of a group of quasars using a combination of GR model and disk model (proposition of Dr. E. Lyratzi, Prof. E. Danezis and Dr. A. Antoniou).
The astrophysical spectroscopy teams of the University of Athens and the Observatory of Belgrade are already working on this subject, in the frame of the scientific collaboration between Greece and Serbia.
6. There are many observed spectra collected by the group of Prof. P. Rafanelli from University of Padova, who proposed to use these spectra for all kind of investigation on quasars (proposition of Prof. P. Rafanelli).

In the field of **History and Philosophy of Astronomy and Physical Sciences**, the Scientific Teams of History and Philosophy of Astronomy and Physical Sciences at the University of Athens and the corresponding scientific group at the Observatory of Belgrade have been collaborating since 2000 on scientific subjects of four basic fields of research:

1. Ancient Greek scientific thought and modern astronomy.
2. Science-Astronomy and Religion.
3. History of modern sciences.
4. Greek and Serbian astronomy in 19th and 20th Century.

The contents of the Session on History and Philosophy of Astronomy and Physical Sciences were:

1. A brief review of our common scientific collaboration.
2. Programming of specific actions in the subjects of our common research.
3. An extension of our collaboration with the corresponding groups of other countries, such as Romania, Bulgaria, Russia etc.

4. Final presentations and discussion in detail on some poster papers in order to enrich them and publish in international journals of History of Astronomy.

At this point we would like to thank Prof. Milan S. Dimitrijević and Prof. Luka Č. Popović for the help, the friendship and the fruitful collaboration during these ten years.

Finally, we would like to thank the organizing committee and Mrs G. Mitsiou for the courageous efforts to organize this workshop faraway from Athens and the sponsors of the workshop that offered us the ability to organize this meeting.

E. Danezis and E. Lyratzi