

Concluding Remarks

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Traditionally there are four persons making the concluding remarks of the conference, so I restricted myself by topics that have connection to my personal interests. I will mostly speak about the disk accretion, where three main topics were discussed during the conference: formation and properties of accretion disks, turbulence in magnetic and non-magnetic objects, and accretion on central objects. I am pleased to note that the scientific level of our meeting proved to be high. I have listened to all 59 talks on these topics and I would like to emphasize the very good organization of the conference program and, in particular, a balanced number of reviews and contributed talks. This approach provided us both with a quite wide introduction to main topics and with the specific studies of the highest level.

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1. My Personal Point of View

I was truly impressed by the opening talk made by Franco Giovannelli & Lola Sabau-Graziati. Generally, all the review talks contained the absolutely comprehensive material available today on the discussed topics, pointed out the open problems and indicated possible ways to their solution. In particular, in a few talks the general problems for all the considered objects were raised: Douglas Lin told us about dynamical similarities among protostellar, AGN, and CV disks; Ester Aranzana Martinez reviewed accretion-induced variability that links young stellar objects, white dwarfs, and black holes; Giora Shaviv presented the method for studying the long-term evolution of CVs; Nazar R. Ikhsanov introduced the idea of a MAGLEV disk, and Jordi Isern told about magnetic white dwarfs with debris disks.

Some review talks were devoted to young stellar objects.: Tomoyuki Hanawa told us about protoplanetary disks; Satoshi Mayama reported observations of protoplanetary disks with Subaru; Vladimir Grinin, Ana Ines Gomez de Castro, and Anna Fateeva presented the features of accretion physics in disks around young stars. We had very interesting talks about wide binary stars: Jennifer Sokoloski, Joanna Mikolajewska, and Shazrene Mohamed told us about symbiotic stars; Nikolai Shakura presented the review of wind accretion. We had a number of perfect review talks about close binary stars by Edward Sion, Solen Balman, Paul Mason, Janusz Ziolkowski, Genady Bisnovatyi-Kogan, Pieter Meintjes, and Marina Orio. I do not repeat their content, since all of them can be found in this book of proceedings, but I want to emphasize that any researcher studying accretion processes will find them useful regardless of the age and scientific status.

It is important to note that during the conference we have discussed a lot of interesting topics, from a classical problem of turbulence to a new window in astronomy opened by gravitational wave detection. The contributed talks have been well prepared and delivered, and the reader may see it when reading the papers in the book of proceedings. I do not want to focus on a particular work, since I hope that the reader will come to these concluding remarks after first getting familiar with the original papers. However, I would like to focus on several important problems addressed in the talks. Summarizing them I conclude that:

- We were able to relate accretion processes at different scales. Obviously, direct scaling between different objects is not possible due to the fact that in each case one should take into account additional physical processes. For example, when we pass from planets to stars we should keep in mind the significant contribution of magnetic fields and gravitational influence of the second component in binaries. When we pass from stars to galaxies we should consider self-gravity and take into account the influence of dark matter, etc.
- However, despite the physical differences in the problems, we can (and hope to) identify general features of the disk accretion and utilize them in the analysis of various astrophysical objects. This is especially important for properties of the accretion disks and the nature of turbulence. As you know (and it has been confirmed during the Conference) turbulence is a hot topic and the ability to generalize data from different astrophysical objects (on different scales) will provide more effective solution to this problem.
- I want to emphasize that in the coming years we will see some space projects which will definitely provide valuable information about the accretion in various objects. Hopefully,

these observations will help us to refine our current physical models and bring us closer to resolving these important issues.

2. Conclusions

Resuming my concluding remarks, I would like to stress that the conference was not only interesting, but also useful. I thank the organizers of the conference not only for the nice time, spent in the marvelous place, but also for the opportunity to discuss all the results in the friendly atmosphere. As I found when talking to many participants, we all are interested in the continuation of this series of meetings and in making this conference regular. Franco Giovannelli & Lola Sabau-Graziati and their team are the main engine of the conference and I hope that they will continue the hard job of organizing the Accretion Processes in Cosmic Sources conferences.