Theory of Accretion Disks

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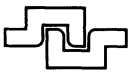

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Theory of Accretion Disks

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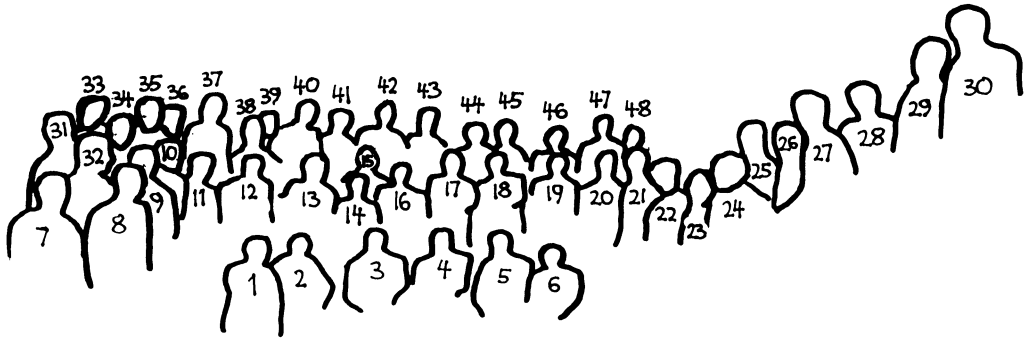

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PREFACE

With the advent of space observatories and modern developments in ground-based astronomy and concurrent progress in the theoretical understanding of these observations it has become clear that accretion of material on to compact objects is an ubiquitous mechanism powering very diverse astrophysical sources ranging in size and luminosity by many orders of magnitude. A problem common to these systems is that the material accreted must in general get rid of its angular momentum and this leads to the formation of an *Accretion Disk* which allows angular momentum re-distribution and converts potential energy into radiation with an efficiency which can be higher than the nuclear burning yield.

These systems range in size from quasars and active galactic nuclei to accretion disks around forming stars and the early solar system and to compact binaries such as cataclysmic variables and low-mass X-ray binaries. Other objects that should be mentioned in this context are SS433, the black hole binary candidates, and possibly gamma-ray burst sources. Observations of these systems have provided important constraints for theoretical accretion disk models on widely differing scales, luminosities, mass-transfer rates and physical environments.

It was therefore appropriate to call together an expert meeting to discuss and evaluate the progress in these different research areas with a common theoretical paradigm: the *Accretion Disk*. This was the purpose of a NATO Advanced Research Workshop on *Theory of Accretion Disks* which took place at the Max-Planck-Institut für Astrophysik in Garching, from 6 to 10 March 1989. The participants constituted a significant fraction of the most active researchers in the field drawn from 10 nations, from different areas of expertise, mainly theoreticians but with a good representation of observers. The hope that recent advances in our understanding of different objects may lead to some cross-fertilization was in our opinion realized in the many open and informal discussions during the meeting.

We are deeply grateful to the NATO Science Committee for providing the main

funding for this Workshop and to the European Space Agency and the Max-Planck-Gesellschaft for further support. We thank Prof. R. Kippenhahn for allowing the Workshop to be held at the Institute and extend our gratitude to the Max-Planck-Institut für Astrophysik and the Institut für Theoretische Astrophysik, Heidelberg, for use of facilities and support before, during and after the meeting. We are also grateful to BMW, the Cray Research Corporation, IBM, and the Tourist Office of the City of Munich for helping us to put together a nice registration folder. We thank all the participants for their lively contributions to the discussion during the sessions and for the prompt submission of their manuscripts. Finally we would like to thank Petra Berkemeyer and colleagues for organizatorial and secretarial help, and to all the members of our Institute who contributed towards a welcoming environment for our Workshop.

F. Meyer, W. Duschl, J. Frank, E. Meyer-Hofmeister

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