

Foreword

This volume presents the lectures given during the Summer School on Stellar Physics which took place September 5–9, 2005 at the Oléron island, on the French Atlantic coast. There were several reasons to organize such a school on tidal effects in stars, planets and disks. First, as Tsevi Mazeh points out, in the last decade several thousands of eclipsing binary stars were detected thanks to large photometric surveys that were designed for another purpose, namely the search for the missing mass in our Galaxy; these surveys yield very accurate measurements that allow to constrain the theoretical models, at least for early-type stars. Tsevi kindly accepted the monumental task of reviewing the bulk of observational evidence for tidal interaction in close binary systems, and he offers us the most complete bibliography of the subject. And one of us recalled the physical processes that are responsible for tidal dissipation. The second motivation for this school was the discovery of an ever increasing number of extra-solar planets, which gives a new impetus to the tidal theory, since tidal effects are clearly operating in these systems. So are also plasma interactions, much as between Jupiter and Ganymede, as Philippe Zarka made us aware. On the theoretical side too, there has been much progress, in particular with the discovery of resonance locking, a powerful mechanism that is described in this volume by Gert-Jan Savonije. The strange behavior of the inertial waves and their potentially important role in the tidal dissipation is now being investigated, as explained by Michel Rieutord. The evolution of triple hierarchical systems, such as Algol, is being tackled by several teams, which were represented in Oléron by Tamás Borkovits and Emese Forgács-Dajka. Finally, Frédéric Masset reminded us that planets form in a disk, and he presented us the spectacular advances that have been made in the numerical modeling of disk-planet interactions. To all lecturers we express our deep thanks for what they have accomplished, there in Oléron and here in written form – for the benefit of a large readership, we trust.

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