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Book review

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Book review

Plasma Astrophysics, Part I: Fundamentals and Practice, by Boris V. Somov, Springer, New York, 2006, xi + 437 pages, 124,95 Euro. Hardcover ISBN-13: 978-0387-34916-9.

If you want to learn the most fundamental things about plasma astrophysics in the least amount of time – and who doesn't? – this text is for you. The book is addressed to young people without a background in plasma physics; it grew from lectures offered to students of the Astronomical Division in the Faculty of Physics at the Moscow State University.

There is no unique simple model of a plasma that encompasses all situations in space. We have to familiarize ourselves with many different models applied to different situations. We need clear guidelines when a model works and when it does not work. Hence the best strategy is to develop an intuition about plasma physics; but how to develop it?

The idea of the book is the consecutive consideration of physical principles, starting from the most general ones, and of simplifying assumptions which give us a simpler description of plasma under cosmic conditions. Thus I would recommend the students to read the book straight through each chapter to see the central line of the plasma astrophysics, its classic fundamentals. In so doing, the boundaries of the domain of applicability of the approximation at hand will be outlined from the viewpoint of physics. After that, as an aid to detailed understanding, please return with pencil and paper to work out the missing steps in the mathematics.

On the basis of such an approach the student interested in modern astrophysics, its current practice, will find the answers to two key questions: (1) what approximation is the best one (the simplest but sufficient) for description of a phenomenon in astrophysical plasma; (2) how to build an adequate model for the phenomenon, for example, a flare in the corona of an accretion disk.

Practice is really important for the theory of astrophysical plasma. Related exercises supplemented to each chapter to improve skills do not thwart the theory but serve to better understand it. Astronomers and astrophysicists of the future will need tools that allow them to explore in many different directions. Moreover astronomy of the future will be, more than hitherto, *precise science* similar to mathematics and physics.

The majority of the book's chapters begin from an 'elementary account' and illustrative examples but finish with the modern results of scientific importance. New problems determine plasma astrophysics as a new, developing science. Open issues are the focus of our attention in many places where they are. In this way, perspectives of the plasma astrophysics with its many applications will also be of interest to readers.

The first volume of the book is unique in covering the basic principles and main practical tools required for work in plasma astrophysics. The second volume, *Plasma Astrophysics*.

Part II. Reconnection and Flares, will represent the basic physics of the magnetic reconnection phenomenon and the flares of electromagnetic origin in space plasmas.

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