DESCRIPTION

A comprehensive textbook and reference for the study of the physics of ionized gases

The intent of this book is to provide deep physical insight into the behavior of gases containing atoms and molecules from which one or more electrons have been ionized. The study of these so-called plasmas begins with an overview of plasmas as they are found in nature and created in the laboratory. This serves as a prelude to a comprehensive study of plasmas, beginning with low temperature and "ideal" plasmas and extending to radiation and particle transport phenomena, the response of plasmas to external fields, and an insightful treatment of plasma waves, plasma instabilities, nonlinear phenomena in plasmas, and the study of plasma interactions with surfaces.

In all cases, the emphasis is on a clear and unified understanding of the basic physics that underlies all plasma phenomena. Thus, there are chapters on plasma behavior from the viewpoint of atomic and molecular physics, as well as on the macroscopic phenomena involved in physical kinetics of plasmas and the transport of radiation and of charged particles within plasmas. With this grounding in the fundamental physics of plasmas, the notoriously difficult subjects of nonlinear phenomena and of instabilities in plasmas are then treated with comprehensive clarity.
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