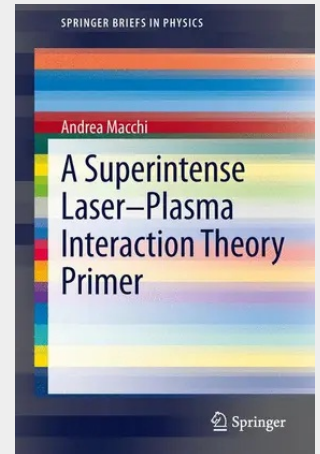


A Superintense Laser-Plasma Interaction Theory Primer

The continuous trend towards higher and higher laser intensities has opened the way to new physical regimes and advanced applications of laser-plasma interactions, thus stimulating novel connections with ultrafast optics, astrophysics, particle physics, and biomedical applications. This book is primarily oriented towards students and young researchers who need to acquire rapidly a basic knowledge of this active and rapidly changing research field. To this aim, the presentation is focused on a selection of basic models and inspiring examples, and includes topics which emerged recently such as ion acceleration, "relativistic engineering" and radiation friction. The contents are presented in a self-contained way assuming only a basic knowledge of classical electrodynamics, mechanics and relativistic dynamics at the undergraduate (Bachelor) level, without requiring any previous knowledge of plasma physics. Hence, the book may serve in several ways: as a compact textbook for lecture courses, as a short and accessible introduction for the newcomer, as a quick reference for the experienced researcher, and also as an introduction to some nonlinear mathematical methods through examples of their application to laser-plasma modeling.

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