Principles of Plasma Physics

Annotation

Basic physics of high temperature plasmas is explained using particle, kinetic and fluid approaches. It includes drift motions and adiabatic invariants, linear theory of waves in plasmas and propagation of electromagnetic waves in inhomogeneous plasmas. Basic non-linear effects, such as ponderomotive force, self-focusing and parametric instabilities are explained. Fokker-Planck collision term is derived and applied. The lecture comprises a brief introduction into magnetohydrodynamics and nuclear fusion. Basics of atomic physics od multiply-ionized plasmas are introduced.

Prerequisites

Fundamentals of mathematical analysis; Mechanics; Electricity and magnetism;
Fundamentals of statistical physics; Fundamentals of quantum theory