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Fundamental Aspects of Plasma Chemical Physics: Kinetics (Hardback)

By Mario Capitelli, Roberto Celiberto, Gianpiero Colonna

Springer-Verlag New York Inc., United States, 2016. Hardback. Condition: New. 1st ed. 2016. Language: English . Brand New Book. Describing non-equilibrium cold plasmas through a chemical physics approach, this book uses the state-to-state plasma kinetics, which considers each internal state as a new species with its own cross sections. Extended atomic and molecular master equations are coupled with Boltzmann and Monte Carlo methods to solve the electron energy distribution function. Selected examples in different applied fields, such as microelectronics, fusion, and aerospace, are presented and discussed including the self-consistent kinetics in RF parallel plate reactors, the optimization of negative ion sources and the expansion of high enthalpy flows through nozzles of different geometries. The book will cover the main aspects of the state-to-state kinetic approach for the description of nonequilibrium cold plasmas, illustrating the more recent achievements in the development of kinetic models including the self-consistent coupling of master equations and Boltzmann equation for electron dynamics. To give a complete portrayal, the book will assess fundamental concepts and theoretical formulations, based on a unified methodological approach, and explore the insight in related scientific problems still opened for the research community.



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