1. Record Nr. UNINA9910300369003321

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Titolo	Magnetic Stochasticity in Magnetically Confined Fusion Plasmas : Chaos of Field Lines and Charged Particle Dynamics / / by Sadrilla Abdullaev
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-01890-6
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (422 p.)
Collana	Springer Series on Atomic, Optical, and Plasma Physics, , 1615-5653 ; ; 78
Disciplina	530.44
Soggetti	Atoms Physics Plasma (Ionized gases) Atoms and Molecules in Strong Fields, Laser Matter Interaction Plasma Physics Numerical and Computational Physics, Simulation Applied and Technical Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Hamiltonian Representation of Magnetic Field -- Magnetic Field Structure of Equilibrium Plasmas -- Magnetic Field Perturbations.- Hamiltonian Equations for the Guiding Center Motion of Particles -- Drift Orbits in Equilibrium Plasmas -- Methods to Study the Hamiltonian Systems -- Onset of Dynamical Chaos: Mathematical Aspects -- Onset of Dynamical Chaos: Physical Aspects -- Magnetic Field Structure Induced by Resonant Magnetic Perturbations in Tokamaks -- Transport of Field Lines and Particles in a Stochastic Magnetic Field -- Transport of Particles in a Turbulent Field.
Sommario/riassunto	This is the first book to systematically consider the modern aspects of chaotic dynamics of magnetic field lines and charged particles in magnetically confined fusion plasmas. The analytical models describing the generic features of equilibrium magnetic fields and magnetic perturbations in modern fusion devices are presented. It describes mathematical and physical aspects of onset of chaos, generic

properties of the structure of stochastic magnetic fields, transport of charged particles in tokamaks induced by magnetic perturbations, new aspects of particle turbulent transport, etc. The presentation is based on the classical and new unique mathematical tools of Hamiltonian dynamics, like the action--angle formalism, classical perturbation theory, canonical transformations of variables, symplectic mappings, the Poincaré-Melnikov integrals. They are extensively used for analytical studies as well as for numerical simulations of magnetic field lines, particle dynamics, their spatial structures and statistical properties. The numerous references to articles on the latest development in the area are provided.The book is intended for graduate students and researchers who interested in the modern problems of magnetic stochasticity in magnetically confined fusion plasmas. It is also useful for physicists and mathematicians interested in new methods of Hamiltonian dynamics and their applications.