1. Record Nr. UNINA9910913789203321

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Titolo	Advances in Atomic Molecular Collisions / / edited by Lokesh C. Tribedi
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2024
ISBN	9789819770632 9819770637
Edizione	[1st ed. 2024.]
Descrizione fisica	1 online resource (286 pages)
Disciplina	539
Soggetti	Atoms Molecules Spectrum analysis Physics Cosmochemistry Quantum statistics Atomic, Molecular and Chemical Physics Spectroscopy Ultracold Gases Applied and Technical Physics Astrochemistry Quantum Gases and Condensates
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	COLTRIMS in Collision Physics -- The Post-Collision Interaction in Ionization by Ion Impact -- Ionization of Water, Ammonia, and Methane by Proton Collision: Experimental and Electronic Configuration Studies -- Fast Ion-Atom Collisions: Electron Spectroscopy of Mixed-State Beams -- EUV Spectroscopy of Highly Charged Ions with an Electron Beam Ion Trap -- On the Dynamics of Fast and Ultrafast Irradiation in Clusters and Molecules -- Inspecting State-Selective Distributions due to Charge Exchange Collisions of Bare Ions with Hydrogen -- Inspecting the Information Quantity in Ion-Hydrogen Electron Capture Process with the Shannon Entropy -- Target Ionization and Electron Loss Processes Induced by Neutral and Charged Hydrogen and Helium

Projectiles in Water Molecule -- Classical-Trajectory Time-Dependent Mean-Field Theory for Ion-Molecule Collision Problems -- Perturbed Relativistic Coupled-Cluster Calculations of the Properties of Ar13+ -- Intermolecular Coulombic Decay: Geometric And Electronic Structures of Ionized Water -- Young Type Electron Interference in Molecular Double Slit: A Brief Overview.

Sommario/riassunto

This book highlights the advances made in the field of atomic and molecular collisions both in the experimental and theoretical fronts. The study of the collision of charged particles with neutral target atoms or molecules started many decades ago. The charged particles mostly include electrons and fast heavy ions. This book discusses basic research in atomic molecular collision physics along with some of the important applications in other branches of physics and peripheral fields, such as plasma physics, radiobiology, astrophysics, nanosciences, antimatter physics, and surface science. The complexity of the target systems led to the need for more sophisticated experimental tools as well as advanced theoretical models. Since the last decade, a major focus has been to investigate the behavior of biomolecules (such as nucleobases) and water when irradiated with protons and heavy ions due its applications toward hadron therapy for cancer and radiobiology in general. The collisions with polycyclic aromatic hydrocarbons find applications toward astrochemistry that take place in the interstellar medium, solar wind as well as UV plasmonic devices. It has been proposed that the collective excitation in these molecules plays a major role in these applications. This book presents details about the advances made and the challenges faced in both experimental and theoretical front for studying the atomic collisions including these aspects. The book can be used as a reference for researchers, professionals, and also students. The recent advances in the sophisticated experimental tools for various types of experiments as well as the progress in the experimental methodologies are addressed along with the advancement in the theoretical front.