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Collana	Springer Series on Atomic, Optical, and Plasma Physics, , 2197-6791 ; ; 124
Disciplina	546.2
Soggetti	Plasma (Ionized gases) Surfaces (Physics) Particle accelerators Atomic structure Molecular structure Plasma Physics Surface and Interface and Thin Film Accelerator Physics Atomic and Molecular Structure and Properties
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Chapter 1. Fundamental processes of hydrogen negative ion production in the ion source plasma volume -- Chapter 2. Fundamental aspect of surface production of hydrogen negative ions -- Chapter 3. Modelling of reaction dynamics in volume production negative hydrogen ion sources -- Chapter 4. Particle-In-Cell Modelling of Negative Ion Sources for fusion applications -- Chapter 5. Particle-In-Cell Modelling with Monte-Carlo Collision of Extraction and Acceleration in Radio-Frequency Negative Ion Sources -- Chapter 6. Plasma neutralisation of 500 keV H- ions -- Chapter 7. Advanced models for negative ion production in hydrogen discharges -- Chapter 8. The plasma sheath in negative ion sources -- Chapter 9. Helicon volume production of H and D using a resonant birdcage antenna on RAID -- Chapter 10. Plasma electrode for Caesium free negative hydrogen ion sources --

Chapter 11. Low temperature high density ion source plasma --
Chapter 12. Fundamental principles of ECR-driven negative ion sources operating with hydrogen and deuterium -- Chapter 13. Dissociative electron attachment to hydrogen and its use for vibrational spectroscopy of hydrogen molecule -- Chapter 14. Physics of surface-plasma H- ion sources -- Chapter 15. Hydrogen negative ion density diagnostic in plasma -- Chapter 16. RF Driven ion sources for Fusion NBI -- Chapter 17. Negative ion source technique and technology -- Chapter 18. Radiofrequency driven, Pulsed High-current H- Ion Sources on Advanced Accelerators -- Chapter 19. Development of High Current Negative-Ion based Beam Source at QST for JT-60U and ITER Neutral Beam Injectors.

Sommario/riassunto

This book gives a comprehensive overview of hydrogen negative ion sources and their applications to particle acceleration and nuclear fusion. The book begins with fundamental aspects of negative ion production by volume and surface processes in hydrogen and its isotopes. It covers key topics, such as the need for separation of negative ion production and extraction regions, the need for lowering the work function of the plasma electrode by using caesium vapor or special materials for caesium-free sources, and the ion extractor structure required for hydrogen negative ion sources. Chapters covering various specific ion sources and applications are written by scientists who participated in their development and include sources for accelerators and for neutral beam injection into controlled nuclear fusion reactors.