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Nota di contenuto	Electron and Proton Kinetics and Dynamics in Flaring Atmospheres; Contents; Preface; Color Plates; 1 Observational Phenomena of Solar Flares; 1.1 Observational Constraints; 1.2 Hard X-Ray Light Curves and Spectra; 1.2.1 Light Curves; 1.2.2 Photon and Electron Energy Spectra; 1.2.3 Electron Numbers; 1.3 Light Curves and Energy Spectra of Gamma-Rays; 1.3.1 -Ray Light Curves; 1.3.2 Energy Spectra and Abundances of Ions in Flares; 1.3.3 Ion Numbers; 1.4 Geometry of Hard X-Ray and Gamma-Ray Sources; 1.4.1 Differences in Footpoint Spectral Indices; 1.4.2 Hard X-Ray and Gamma-Ray Source Locations 1.5 Pre- and Postflare Hard X-Ray and Radio Emission1.6 Magnetic Field Changes Associated with Flares; 1.6.1 Local Magnetic Field Variations; 1.7 UV and Optical Emission; 1.8 Seismic Responses; 1.9 Critical Issues; 2 Particle Acceleration in Flares; 2.1 Models of Particle Acceleration; 2.1.1 Basic Physics; 2.1.2 Magnetic Reconnection Models Associated with Flares; 2.1.3 Particle Acceleration in a Reconnecting Current Sheet; 2.1.4 Particle Acceleration by Shocks and Turbulence;

2.2 Recent Theoretical Developments; 2.2.1 Stochastic Acceleration
2.2.2 Electron Acceleration in Collapsing Current Sheets2.2.3 Particle Acceleration in a Single 3-D RCS with Complicated Magnetic Topology; 2.2.4 Estimations of Accelerated Particle Parameters; 2.2.5 Comparison of the Parameters of Accelerated Particles; 2.2.6 Particle Acceleration in 3-D MHD Models with Fan and Spine Reconnection; 2.3 Limitations of the Test-Particle Approach; 2.3.1 The Polarization Electric Field; 2.3.2 Turbulent Electric Fields; 2.4 Particle-in-Cell Simulation of Acceleration in a 3-D RCS; 2.4.1 Problem Formulation; 2.4.2 Test-Particle Simulations
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3.3 Continuity Equation Approach for Electrons: Pure Collisions3.3.1 Solutions of Continuity Equation for Power-Law Beam Electrons; 3.3.2 Beam Electron Densities; 3.3.3 Mean Electron Spectra; 3.3.4 Hard X-Ray Bremsstrahlung Emission by Beam Electrons; 3.3.5 Heating Functions; 3.4 Continuity Equation Approach for Electrons - Pure Electric Field; 3.4.1 Estimation of the Ohmic Loss Effect; 3.4.2 Kinetic Solutions for a Pure Electric Field; 3.4.3 Estimations of Electron-Beam Stability; 4 Electron Beam Precipitation - Fokker-Planck Approach; 4.1 General Comments on Particle and Energy Transport
4.2 Problem Formulation

Sommario/riassunto

This timely book presents new research results on high-energy particle physics related to solar flares, covering the theory and applications of the reconnection process in a clear and comprehensible way. It investigates particle kinetics and dynamics in flaring atmospheres and their diagnostics from spectral observations, while providing an analysis of the observation data and techniques and comparing various models.Written by an internationally acclaimed expert, this is vital reading for all solar, astro-, and plasma physicists working in the field.