

1. Record Nr.	UNINA9910826396303321
Autore	Stepanov Alexander V
Titolo	Coronal seismology : waves and oscillations in stellar coronae // A.V. Stepanov, V.V. Zaitsev, and V.M. Nakariakov
Pubbl/distr/stampa	Weinheim, : Wiley-VCH, 2012
ISBN	3-527-64600-0 1-280-66291-3 9786613639844 3-527-64598-5 3-527-64601-9
Edizione	[1st ed.]
Descrizione fisica	1 online resource (233 p.)
Altri autori (Persone)	ZaitsevV. V NakariakovV. M
Disciplina	500 523.75
Soggetti	Astrophysics Sun Corona
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	Coronal Seismology; Contents; Preface; 1 Introduction; 1.1 Magnetic Loops and Open Flux Tubes as Basic Structural Elements in Solar and Stellar Coronae; 1.2 Data of Observations and Types of Coronal Loops; 1.3 The MHD Approach for Coronal Plasma; References; 2 Coronal Magnetic Loop as an Equivalent Electric Circuit; 2.1 A Physical Model of an Isolated Loop; 2.2 The Formation of Magnetic Tubes by Photospheric Convection; 2.3 The Structure of the Coronal Part of a Flux Tube; 2.4 Diagnostics of Electric Currents; 2.4.1 "Warm" Loops; 2.4.2 "Hot X-ray" Loops; 2.4.2.1 Flare Magnetic Loops 2.5 The Equivalent Electric Circuit 2.6 Inductive Interaction of Magnetic Loops; 2.7 Waves of Electric Current in Arcades of Coronal Magnetic Loops; 2.8 Magnetic Loops above Spots; References; 3 Resonators for MHD Oscillations in Stellar Coronae; 3.1 Eigenmodes of Coronal Loops: The Plasma Cylinder Approach and the Dispersion Equation; 3.1.1 Trapped Modes; 3.1.1.1 Global Sausage Mode; 3.1.1.2 Global Kink Mode; 3.1.2 Leaky Modes; 3.1.2.1 Sausage Mode; 3.1.2.2 Kink Modes;

3.1.3 Ballooning Modes; 3.2 MHD Resonator at  $\sim 1R_0$  in the Solar Corona; 3.3 Excitation Mechanisms for Loop Oscillations  
3.3.1 External Triggers 3.3.2 Parametric Excitation of Loop Oscillations by p-Modes; 3.3.3 Internal Excitation; 3.3.3.1 The Excitation of the Sausage Mode by Instantaneous Energy Release; 3.3.3.2 The Excitation of the Global Kink Mode by Chromosphere Evaporation; 3.3.3.3 The Excitation of the Sausage Mode by High-Energy Protons under the Bounce-Resonance Condition; References; Further Reading; 4 Propagating MHD Waves in Coronal Plasma Waveguides; 4.1 MHD Waves in Vertical Coronal Magnetic Flux Tubes; 4.1.1 Effects of Stratification; 4.2 Propagating Waves in Coronal Loops  
4.2.1 Propagating Compressible Waves in Coronal Loops 4.2.2 Transverse Waves in Coronal Loops; 4.3 Waves in Coronal Jets; 4.4 Evolution of Short-Wavelength, Fast Magnetoacoustic Waves; 4.5 Alfvén Wave Phase Mixing; 4.5.1 Damping of Alfvén Waves because of Phase Mixing; 4.5.2 Enhanced Nonlinear Generation of Oblique Fast Waves by Phase-Mixed Alfvén Waves; References; 5 Prominence Seismology; 5.1 Prominence Models; 5.2 Prominence Oscillations; 5.3 The Heating Effect; 5.4 Nonlinear Oscillations: Dynamical Modes; 5.5 Flare Processes in Prominences; 5.6 Stellar and Interstellar Prominences  
References 6 The Coronal Loop as a Magnetic Mirror Trap; 6.1 Particle Distribution in a Coronal Loop; 6.1.1 Gyrosynchrotron Emission from a Flaring Loop; 6.2 Kinetic Instabilities in a Loop; 6.2.1 A Loop as an Electron Cyclotron Maser; 6.2.2 The Plasma Mechanism of the Radio Emission from Coronal Loops; 6.2.3 Instabilities of Whistlers and Small-Scale Alfvén Waves; 6.3 The Fine Structure of Radio Emission from Coronal Loops; 6.3.1 Sudden Reductions; 6.3.2 Zebra Pattern; 6.3.3 Diagnostics of Coronal Plasma Using the Fine Structure of Radio Emission; References  
7 Flaring Events in Stellar Coronal Loops

---

## Sommario/riassunto

This concise and systematic account of the current state of this new branch of astrophysics presents the theoretical foundations of plasma astrophysics, magneto-hydrodynamics and coronal magnetic structures, taking into account the full range of available observation techniques -- from radio to gamma. The book discusses stellar loops during flare energy releases, MHD waves and oscillations, plasma instabilities and heating and charged particle acceleration. Current trends and developments in MHD seismology of solar and stellar coronal plasma systems are also covered, while recent p

---