

1. Record Nr.	UNINA9910337882403321
Autore	Linsky Jeffrey
Titolo	Host Stars and their Effects on Exoplanet Atmospheres : An Introductory Overview / / by Jeffrey Linsky
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2019
ISBN	3-030-11452-X
Edizione	[1st ed. 2019.]
Descrizione fisica	1 online resource (X, 273 p. 143 illus., 104 illus. in color.)
Collana	Lecture Notes in Physics, , 0075-8450 ; ; 955
Disciplina	523.82 523.2
Soggetti	Planetary science Exobiology Atmospheric science Solar system Space sciences Planetary Sciences Astrobiology Atmospheric Sciences Planetology Solar and Heliospheric Physics Space Sciences (including Extraterrestrial Physics, Space Exploration and Astronautics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Why are Host Stars Important for Understanding Exoplanet Atmospheres? -- Stellar activity--phenomenology and general principles -- Magnetic Fields--the Source of Stellar Activity -- Stellar Chromospheres--the Source of UV Emission -- Stellar Coronae--the Source of X-ray Emission -- Reconstructing the Missing Stellar Emission -- Stellar Winds -- Correlations of Observables with Stellar Age and Rotation -- Stellar Space Weather--Connecting Host Stars to Their Exoplanets - Host Star Driven Exoplanet Mass Loss -- Host Star Driven Photochemistry in Exoplanet Atmospheres -- Star-Planet Interactions (SPI)--Real or Imaginary? -- Final Comments and

Speculation.

Sommario/riassunto

Like planets in our solar system, exoplanets form, evolve, and interact with their host stars in many ways. As exoplanets acquire material and grow to the final size, their atmospheres are subjected to intense UV and X-radiation and high-energy particle bombardment from the young host star. Whether a planet can retain its atmosphere and the conditions for significant mass loss both depend upon the strength of the host star's high-energy radiation and wind, the distance of the exoplanet from its host star, the gravitational potential of the exoplanet, and the initial chemical composition of the exoplanet atmosphere. This introductory overview describes the physical processes responsible for the emission of radiation and acceleration of winds of host stars that together control the environment of an exoplanet, focusing on topics that are critically important for understanding exoplanetary atmospheres but are usually not posed from the perspective of host stars. Accordingly, both host stars and exoplanets are not studied in isolation but are treated as integrated systems. Stellar magnetic fields, which are the energy source for activity phenomena including high-energy radiation and winds, play a critical role in determining whether exoplanets are habitable. This text is primarily for researchers and graduate students who are studying exoplanet atmospheres and habitability, but who may not have a background in the physics and phenomenology of host stars that provide the environment in which exoplanets evolve. It provides a comprehensive overview of this broad topic rather than going deeply into many technical aspects but includes a large list of references to guide those interested in pursuing these questions. Nonspecialists with a scientific background should also find this text a valuable resource for understanding the critical issues of contemporary exoplanet research.