Paper ID: 79464
student

IAF SYMPOSIUM ON ONGOING AND NEAR FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Interactive Presentations - IAF SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SPACE PHYSICS (IP)

Author: Mr. Debarshi Mukherjee
India

EXPLORING THE ATMOSPHERIC COMPOSITION AND DYNAMICS OF EXOPLANETS USING TRANSMISSION SPECTROSCOPY

Abstract

The discovery of exoplanets has opened up a new frontier in the search for life beyond our Solar System. One of the key challenges in characterizing these exoplanets is understanding their atmospheric composition and dynamics, which are crucial factors in determining their habitability. Transmission spectroscopy is a powerful technique that has been used to probe the atmospheres of exoplanets, enabling the detection and analysis of absorption features that provide insights into their chemical composition and physical properties. In this study, we present a comprehensive analysis of the atmospheric composition and dynamics of a sample of exoplanets using transmission spectroscopy. Our sample includes a range of exoplanets with different masses, radii, and orbital parameters, including both hot Jupiters and super-Earths. We use data from a variety of telescopes and instruments, including the Hubble Space Telescope, the Spitzer Space Telescope, and ground-based observatories, to obtain high-quality transmission spectra. Our analysis reveals a diverse range of atmospheric compositions and dynamics among the exoplanets in our sample. We find evidence for a variety of chemical species, including water vapor, methane, carbon dioxide, and nitrogen, as well as the presence of clouds and hazes. In addition, we investigate the effects of stellar activity, atmospheric escape, and planetary dynamics on the atmospheric properties of exoplanets. Our results have important implications for the study of exoplanet habitability and the search for life beyond our Solar System. Understanding the atmospheric composition and dynamics of exoplanets is crucial for identifying those that may have the potential to support life, and for interpreting the results of future observations with upcoming telescopes such as the James Webb Space Telescope. Our study provides valuable insights into the diversity and complexity of exoplanet atmospheres, and highlights the importance of continued observations and analysis in this rapidly evolving field of research.