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# Exoplanetary Atmospheres

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## Abstract

Exoplanetary discoveries in the past two decades have unveiled an astonishing diversity in the physical characteristics of exoplanetary systems, including their orbital properties, masses, radii, equilibrium temperatures, and stellar hosts. Exoplanets known today range from gas-giants to nearly Earth-size planets, and some even in the habitable zones of their host stars. Recent advances in exoplanet observations and theoretical methods are now leading to unprecedented constraints on the physicochemical properties of exoplanetary atmospheres, interiors, and their formation conditions. I will discuss the latest developments and future prospects of this new era of exoplanetary characterization. In particular, I will present some of the latest constraints on atmospheric chemical compositions of exoplanets, made possible by state-of-the-art high-precision observations from space and ground, and their implications for atmospheric processes and formation conditions of exoplanets. The emerging framework for using atmospheric elemental abundance ratios for constraining the origins and migration pathways of giant exoplanets, e.g. hot Jupiters, will also be discussed. A survey of theoretical and observational directions in the field will be presented along with several open questions on the horizon.

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