

From Stars to Planets: How Planet-Formation Environments Shape Planetary Compositions

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With the advent of the JWST era and the upcoming generation of space- and ground-based facilities, understanding the connection between planetary compositions and the properties of their native environments has become a central challenge in exoplanet research. This connection is shaped by the process of planet formation and is profoundly influenced by the thermophysical and chemical properties of the gas and solids that planets accrete from their circumstellar discs. While early models often used the Solar Nebula as a template with simple ice-line chemistry, it is now clear that planet formation occurs around a variety of stars and at different stages of disc evolution. In this talk, I will discuss how planetary compositions are shaped by both the initial chemical and thermophysical conditions in discs and their subsequent evolution over time. I will also illustrate key metrics that have emerged from recent exploration of this parameter space, highlighting how knowledge of stellar properties in a broader Galactic context provides important constraints on the variety of planets that can form around different stars.

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