

Challenges in Discerning Atmospheric Composition in Directly Imaged Planets

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Abstract

One of the justifications motivating efforts to detect and characterize young extrasolar giant planets has been to measure atmospheric composition for comparison with that of the primary star. If the enhancement of heavy elements in the atmospheres of extrasolar giant planets, like it is for their solar system analogs, is inversely proportional to mass, then it is likely that these worlds formed by core accretion. However in practice it has been very difficult to constrain metallicity because of the complex effect of clouds. Cloud opacity varies both vertically and, in some cases, horizontally through the atmosphere. Particle size and composition, both of which impact opacity, are difficult challenges both for forward modeling and retrieval studies. In my presentation I will discuss systematic efforts to improve cloud studies to enable more reliable determinations of atmospheric composition. These efforts are relevant both to discerning composition of directly imaged young planets from ground based telescopes and future space based missions, such as WFIRST and LUVOIR

