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Planetary population synthesis

Christoph Mordasini (1,3), Yann Alibert (2,3), Willy Benz (3), and Hubert Klahr (1)

(1) Max Planck Institute for Astronomy, PSF, Heidelberg, Germany (mordasini@mpia.de, +49 6221 528 246), (3) Physikalisches Institut, Universität Bern, Bern, Switzerland (willy.benz@space.unibe.ch, +41 31 631 4405), (2) Institut UTINAM, CNRS-UMR 6213, Observatoire de Besançon, Besançon, France (alibert@obs-besancon.fr, +33 03 81 66 69 44)

The number of extrasolar planets is now high enough to constrain planet formation models in a statistical sense. In this talk, I will show how the population of extrasolar planets can serve as a test-bed for the core accretion formation model through the observed distributions of basic planetary properties, for example of their mass and semimajor axis, but also of their internal composition.

I will show how we use our extended core accretion planet formation model to generate populations of synthetic extrasolar planets. To do so, we vary the initial conditions of the model according to distributions which are derived from the observation of protoplanetary disks. We then compare the statistical properties of the synthetic planets with the actual ones. I will present the core accretion formation model, how it was tested for the giant planets of our own solar system, the population synthesis method, the comparison of synthetic and actual exoplanets and finally recent results regarding the CoRoT and the Kepler missions, and the effects of updated planetary migration models.