
Origin and Interiors of Giant Planets: The Solar System and Beyond

Ravit Helled (University of Zurich)

Planets are diverse and mysterious astronomical objects. The accurate measurements of planets within and outside our Solar System provide exciting data that advances our understanding of planets. Nevertheless, the questions 'How do planets form?', 'How do planets evolve?' and 'What are planets made of?' are yet to be fully answered. Gas giant planets are the first planets to form, and due to their large masses they affect the dynamical evolution of young planetary systems. In addition, giant planet composition reveals key information on the birth environment of planets. In this talk I will briefly summarise giant planet formation, evolution, and interior models. I will present new structure models of Jupiter (and Saturn) and show that giant planets are complex objects that can have composition gradients and fuzzy cores, and that their internal structure and evolution depend on their origin and evolution. I will also briefly discuss the importance of Uranus and Neptune and identify the key open questions regarding their formation and interior. Finally, I will present recent developments in giant planet theory and show how they can be used to improve our understanding of giant and intermediate-mass exoplanets.