

[IS3] Hot Jupiters, Cool Neptunes, and Extrasolar Earths:
Topics in the Search for Extrasolar Planets

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In the past decade, over 150 planets have been discovered orbiting solar-type stars. Although these discoveries have provided the first tantalizing clues to the origins of planetary systems, our picture of planet formation and evolution remains woefully incomplete. I will discuss three novel directions in the search for extrasolar planets that will allow us to paint a more complete picture of planet formation. I first review the landscape of transit searches for extrasolar planets, highlighting some of their basic properties, primary obstacles, and important results. I then summarize the theory of, results from, and future prospects for microlensing searches for extrasolar planets. Finally, I consider the future prospects for detecting Earth-mass planets around main-sequence stars using radial velocities, transits, astrometry, and microlensing.

[IS4] The Origin of Galaxies

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The galaxy formation is thought to proceed in a bottom-up fashion in the context of cold dark matter cosmology. The galaxy formation is closely related to the cosmic reionization, which is inferred to have taken place at redshift around 20 from the recent WMAP results. The first generation objects born at $z > 20$ are responsible for the reionization, and influence strongly the subsequent galaxy formation processes. In this talk, the recent advances on the formation of first generation objects, the cosmic reionization, and the formation of galaxies in an reionized universe are addressed.