Formation and Compositions of Planet Interiors and Atmospheres: New Discoveries from Wide-Field Transit Surveys

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Abstract: The Kepler mission revolutionized our understanding of the demographics of extrasolar planets. However, because Kepler observed only 1/400 of the sky, most Kepler planets are too distant to permit detailed measurements of their masses, orbits, and atmospheres. Recently, the K2 mission helped extend Kepler's legacy by surveying 20x more sky, and TESS is on its way toward surveying the entire sky. These wide-field surveys cast a wide net for planets around nearby bright stars that are more amenable to precise characterization. In this talk, I will highlight how the planets found by these surveys have provided a window into exoplanet interior composition, orbital dynamics, and formation histories. In particular, they are helping to illuminate a mysterious class of planets between Neptune and Saturn size, that are not present in our Solar System. These planets have mean densities ranging from 2.0 g/cc (concrete) to 0.05 g/cc (Styrofoam) and offer an intriguing window into the processes that form and sculpt planetary systems.

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