

Physics Department Colloquium

“Galaxy Evolution from Galaxy Clustering”

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While understanding the evolution of galaxies is one of the major themes of contemporary astronomy, most empirical studies focus only on the evolution of distribution functions (e.g., the luminosity function), effectively treating galaxies in isolation. The new generation of large imaging and spectroscopic surveys make it possible to measure the clustering of galaxies with different physical properties as a function of redshift, providing complementary information to traditional distribution function studies. This approach is especially powerful because most theoretical models of galaxy evolution are based on the underlying distribution of dark matter halos, so they make strong predictions for clustering evolution. To link galaxies to dark matter halos from the observed galaxy clustering, I will introduce the halo occupation distribution (HOD), which characterizes the relation between galaxies and dark matter halos by the probability distribution that a halo of virial mass M contains N galaxies of a given type, together with the spatial and velocity distributions of galaxies within halos. I will present HOD modeling results for galaxy clustering measured in several surveys, including the SDSS ($z \sim 0$), the DEEP2 ($z \sim 1$), and the NOAO Deep Wide-Field Surveys ($0 < z < 1$). I will demonstrate that, by linking galaxies to dark matter halos, HOD modeling of galaxy clustering opens a new direction in studying galaxy evolution.

Thursday, March 12, 2009
4:00 PM in 102 JFB
Refreshments at 3:30 PM in 219 JFB