



THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics
SEMINAR

**Clustering of Sloan Digital Sky Survey III Galaxies:
The Measurement, Systematics and
Cosmological Implications**

by

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Place: Rm 311 Science Centre North Block, CUHK

ALL INTERESTED ARE WELCOME

Abstract

The Sloan Digital Sky Survey (SDSS) surveyed 14,555 square degrees, and delivered over a trillion pixels of imaging data. We present a study of galaxy clustering using 900,000 luminous galaxies with photometric redshifts, spanning between $z = 0.45$ and $z = 0.65$, constructed from the SDSS using methods described in Ross et al. (2011). This data-set spans 11,000 square degrees and probes a volume of $3h^{-3}$ Gpc³, making it the largest volume ever used for galaxy clustering measurements. We present a novel treatment of the observational systematics and its applications to the clustering signals from the data set. In this paper, we measure the angular clustering using an optimal quadratic estimator at 4 redshift slices with an accuracy of $\sim 15\%$ with bin size of $\delta_l = 10$ on scales of the Baryon Acoustic Oscillations (BAO) (at $l \sim 40-400$). We derive cosmological constraints using the full-shape of the power-spectra. For a flat Lambda CDM model, when combined with Cosmic Microwave Background Wilkinson Microwave Anisotropy Probe 7 (WMAP7) and H_0 constraints from 600 Cepheids observed by HST, we find $\Omega_\Lambda = 0.73 \pm 0.019$ and H_0 to be 70.5 ± 1.6 km/s/Mpc. For an open Lambda CDM model, when combined with WMAP7 + HST, we find $\Omega_K = 0.0035 \pm 0.0054$, improved over WMAP7+HST alone by 40%. For a wCDM model, when combined with WMAP7+HST+SN, we find $w = -1.071 \pm 0.078$, and H_0 to be 71.3 ± 1.7 km/s/Mpc, which is competitive with the latest large scale structure constraints from large spectroscopic surveys such as SDSS Data Release 7 (DR7) (Reid et al. 2010, Percival et al. 2010, Montesano et al. 2011) and WiggleZ (Blake et al. 2011). The SDSS-III Data Release 8 (SDSS-III DR8) Angular Clustering Data allows a wide range of investigations into the cosmological model, cosmic expansion (via BAO), Gaussianity of initial conditions and neutrino masses.

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