

Seminar

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The Canadian Hydrogen Intensity Mapping Experiment

21 cm Intensity Mapping is a new technique to map the large-scale structure in the Universe in three dimensions using the red-shifted emission from cosmic neutral hydrogen. Without needing to resolve individual galaxies, it can survey unprecedented volumes, which makes it an ideal method to measure the Baryon Acoustic Oscillations as a function of redshift and thus place constraints on the cosmic expansion history $H(z)$ and the dark energy equation of state $w(z)$. However, foreground removal is quite challenging, since the cosmic signal is several orders of magnitude below the bright galactic signal. The Canadian Hydrogen Intensity Experiment (CHIME) is a new digital radio telescope with no moving parts. Situated in Canada, it will observe the northern sky every day over the wide radio frequency band of 400 - 800 MHz, which maps to a redshift range of $0.8 < z < 2.5$ for 21 cm emission. This cosmic epoch has been poorly surveyed to date, but it includes the era in when dark energy came to dominate the energy density of the Universe. In this talk I will introduce CHIME, explain its design, its science goals, and its associated data analysis challenges. Analyzing CHIME data is a complex task, so we employ end-to-end simulations of the experiment, with known inputs, to develop and validate our data reduction and foreground filtering techniques.

Tuesday, 09.01.2018, 14:15 Uhr

Place: D6-135