

Probing cosmology with the peculiar velocity field

Friday 7 February 2025 15:30 (30 minutes)

Peculiar velocities are velocities imparted onto galaxies by the gravitational influence of their local environment, and so are uniquely suited to be optimal probes of cosmic growth in the local universe. Current and future surveys will cover the entire sky out to redshift $z \sim 0.15$ and will measure peculiar velocities for hundreds of thousands of galaxies in that volume. Using such an abundance of data, we will be able to measure the growth rate of large-scale structure with accuracy comparable to the sub-one percent measurements of the cosmic expansion history. In this presentation, I will describe my work in utilising direct peculiar velocity measurements and the peculiar velocity field to measure cosmological parameters. In particular, I will discuss how galaxy clustering and peculiar velocities statistics may be combined to produce more accurate constraints of the growth rate, and how reconstructions of the local peculiar velocity field inferred from the galaxy density field may be used to reduce the error on estimates of the Hubble constant made with standard sirens and standard candles.

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Session Classification: Session 14