Contribution ID: **92** Type: **not specified**

A new test of the Cosmological Principle: measuring our peculiar velocity and the large-scale anisotropy independently

Tuesday, November 2, 2021 2:00 PM (1h 20m)

I shall present a novel approach to disentangle two key contributions to the largest-scale anisotropy of the galaxy distribution: (i) the intrinsic dipole due to clustering and anisotropic geometry, and (ii) the kinematic dipole due to our peculiar velocity. Including the redshift or angular size of galaxies, in addition to their fluxes and positions allows us to measure both the direction and amplitude of our velocity independently of the intrinsic dipole of the source distribution. This method enables two simultaneous tests of the Cosmological Principle: comparing the observations of our peculiar velocity with the CMB dipole, and testing for a significant intrinsic anisotropy on large scales which indicates effects beyond the standard cosmological model. I shall discuss the prospects of this new method for future galaxy surveys like LSST and Euclid (with galaxy redshifts) or SKA (with galaxy sizes).

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