

Using the motion of galaxies to investigate the nature of dark matter

Two of the biggest mysteries of modern cosmology are the nature of dark matter and dark energy. One of the leading candidates for explaining these is a modified theory of gravity. In this talk, I will present an improved method of using the motion of galaxies (peculiar velocity) to measure the rate of growth of the Large-Scale Structure. The growth rate of the Large-Scale Structure ($f\sigma_8$) is indicative of the strength of gravity, which is different in different theories of gravity. We used one of the largest peculiar velocity catalogues to date – the SDSS peculiar velocity catalogue to obtain one of the tightest constraints on the growth rate of Large-Scale Structure. We found our constraints are consistent with the prediction of general relativity with cold dark matter. Future surveys such as 4MOST and DESI will provide an order of magnitude more measurements on peculiar velocities than the SDSS. I will also show a forecast of the constraint on the growth rate of the Large-Scale Structure with these future surveys.

Title of the Poster/Talk

Related Papers/Preprints

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