

Discovering Galactic substructure with astrometric lensing using the power spectrum

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Dark matter (DM) substructure is expected to exist over a large range of scales in our Galaxy. Its properties, such as its spatial distribution and abundance at different mass scales, can strongly correlate with the underlying particle physics properties of dark matter. Inferring DM substructure properties can thus hold the key to pinning down the particle nature of DM. In this talk, I will describe how the pattern of correlated velocities and acceleration induced due to gravitational lensing by subhalos in our Galaxy on the motions of extragalactic objects such as quasars can be used to infer the nature of substructure by directly and statistically probing the subhalo mass function. I will show how this measurement can be used to test the cold dark matter (CDM) hypothesis and distinguish it from alternative scenarios, and how this can be practically achieved with future astrometric surveys and/or radio telescopes such as the Square Kilometer Array.

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