



Department of Physics and Astronomy  
SPRING 2025 Colloquium Series

# “Testing the Nature of Dark Matter with Strong Gravitational Lensing”

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Understanding the nature of dark matter is one of the major goals of modern physics. A key prediction of all dark matter models is that galaxies exist in extended dark matter halos. The abundance and density profiles of these halos depends directly on the physics of the candidate dark matter model. Strong gravitational lensing enables a direct measurement of these properties for halos at cosmological distances, without requiring halos to contain any baryons at all and thus provides a unique and powerful way to probe the nature of dark matter. I will present our recent results using strongly lensed quasar narrow-line emission to constrain the density profiles and mass function of dark matter halos and to provide some of the strongest constraints to date on warm-dark matter, self-interacting dark matter, and fuzzy dark matter models. I will also present new results from our ongoing JWST survey to measure strongly lensed quasar dusty torus flux ratios. I will conclude by discussing future prospects for strong gravitational lensing in the era of upcoming large surveys and the next generation of 30-meter class telescopes.

**Thursday, February 6, 2025**

**4:00 - 5:20PM**

**MND1015**

*Open & Free to all students, faculty and public*