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New constraints on the density profiles of subhaloes with gravitational imaging

Thursday, 11 July 2024 15:30 (30 minutes)

Strong gravitational lensing is one of the most promising methods for studying the nature of dark matter. It allows one to detect low-mass dark haloes within the haloes of lens galaxies and along their line of sight, providing a quantitative test of the Cold Dark Matter (CDM) paradigm in a halo mass regime and distances that are not accessible to any other technique. So far, two detections of dark perturbers in strong lensing systems have been reported. Both perturbations are extremely compact, posing potential challenges to the CDM model. I will present a new analysis of the two detections, including constraints on the density profiles and a comparison to CDM predictions derived from hydrodynamical simulations. I will then discuss upcoming promising optical and radio observations that may allow us to push the detection limits to lower masses and obtain a larger statistical sample. These are being used to set new constraints on cold, warm and fuzzy dark matter.

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Session Classification: Exploring the Universe with strong gravitational lensing

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