Contribution ID: **17** Type: **Talk**

Constraining dark matter models with strong gravitational lensing and simulations

Thursday 26 March 2020 08:30 (15 minutes)

Strong gravitational lensing is one of the most accurate methods to measure the mass of galaxies and haloes and one of the most promising to investigate the nature of dark matter. Given that the abundance of small-mass and dark clumps is very different in cold and warm dark matter model, this kind of observations can put important constraints on the nature of dark matter, through the detection of small-scale perturbations of the surface brightness distribution of lensed arcs. In order to meaningfully interpret observational results, we derived detailed predictions for the detection expectations in different dark matter scenarios, using theoretical models and numerical simulations. In particular, I will present predictions for future observations, quantifying how many lenses and which resolution we would need to put stringent constraints on the nature of dark matter and discriminate CDM from WDM, considering both substructures and haloes along the line-of-sight as sources of perturbation. Moreover, I will present results coming from high resolution hydrodynamical simulations run with sterile neutrino warm dark matter and self-interacting dark matter, showing what is the effect of each of these models on the properties of the lens galaxies, the lensing signal and the abundance of low-mass (sub)haloes.

Author: DESPALI, Giulia (Max Planck Institute for Astrophysics)

Presenter: DESPALI, Giulia (Max Planck Institute for Astrophysics)

Session Classification: Session 5

Track Classification: Dark matter and structure in the Universe