

ISRAEL PHYSICS COLLOQUIUM

Prof. Cora Dvorkin

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Monday | November 23, 2020 | 16:00

Novel Probes of Dark Matter

Cosmological observations and galaxy dynamics seem to imply that 84% of all matter in the universe is composed of dark matter, which is not accounted for by the Standard Model of particles. The particle nature of dark matter is one of the most intriguing puzzles of our time. The wealth of knowledge which is and will soon be available from cosmological surveys will reveal new information about our universe. I will discuss how we can use new and complementary data sets to improve our understanding of the particle nature of dark matter. In particular, galaxy-scale strong gravitational lensing provides a unique way to detect and characterize dark matter on small scales. I will present advances in the analysis of gravitational lenses and identification of small-scale clumps using machine learning. I will introduce the convergence power spectrum as a promising statistical observable that can be extracted from strongly lens images and used to distinguish between different dark matter scenarios, showing how different properties of the dark matter get imprinted at different scales. I will also discuss the different contribution of substructure and line-of-sight structure to perturbations in strong lens images.

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