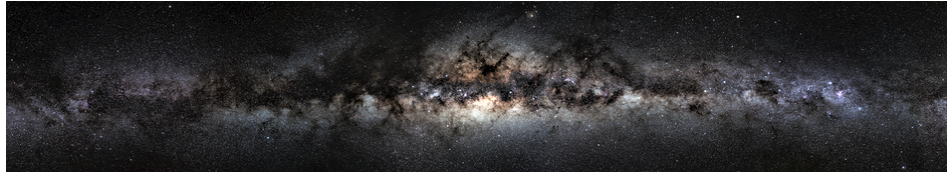


Dark Sectors of Astroparticle Physics (AstroDark-2021): Axions, Neutrinos, Black Holes and Gravitational Waves



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Friendship in the Axiverse

Tuesday, 7 December 2021 12:14 (18 minutes)

A generic low-energy prediction of string theory is the existence of a large collection of axions, commonly known as a string axiverse. In a realistic axiverse, string axions can be distributed densely over many orders of magnitude in mass, and are expected to interact with one another through their joint potential. In this talk, I will show how non-linearities in this potential can lead to a new type of resonant energy transfer between axions with nearby masses. This resonance generically transfers energy from axions with larger decay constants to those with smaller decay constants, leading to a multitude of signatures. These include enhanced direct detection prospects for a resonant pair comprising even a small subcomponent of dark matter, and boosted small-scale structure if the pair is the majority of DM. Near-future iterations of experiments such as ADMX and DM Radio will be sensitive to this scenario, as will astrophysical probes of DM substructure.

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