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Superradiant interactions of cosmic noise

Monday 22 September 2025 12:18 (20 minutes)

In this talk I will do three things. First, I will outline the conditions under which the interaction rate of inelastic processes with a system consisting of N targets scales as N^2 . Second, I will present computations of interaction rates for several weakly interacting particles, including the Cosmic Neutrino Background and Axion Dark Matter, and will explain the underlying physics. Third, I will present a concrete experimental protocol that can extract these effects through quantum observables not relying on net energy transfer. In particular, this protocol will allow to probe QCD Axion Dark Matter, among other cosmic relics, with current technologies in a wide range of parameter space. This work points to a new class of table-top and ultra-low threshold particle detectors.

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