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ALPs coupled to nucleons shining into photons

Wednesday 12 June 2024 17:00 (10 minutes)

In this talk I will explore the phenomenology of Axion-Like Particles (ALPs) coupled to nucleons. I will argue that these couplings must descend from a high-energy theory where ALPs are coupled to both gluons and quarks, which could naturally induce a low-energy coupling to photons. In this scenario, I will discuss the low-energy phenomenology for these ALPs, focusing on their production in core-collapse Supernovae. In particular, the induced photon coupling allows ALPs with masses $m_a \lesssim 1$ MeV to efficiently decay into photon pairs. Then, I will show how the related astrophysical observables can severely constrain the ALP parameter space, enlarging the region ruled out by the usual SN cooling bound.

Presenter: LELLA, Alessandro