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The Hunt for Non-Resonant Signals of Axion-Like Particles at the LHC

Tuesday, 12 December 2023 12:15 (1 hour)

Abstract : We will discuss an Effective Field Theory which extends the SM by an Axion-Like Particle (ALP) and mainly focus on the interactions of a light ALP to heavy SM particles. The talk is dedicated to the role of the LHC in probing ALP couplings particularly with the Higgs boson and the gauge bosons. We discuss a recent proposal to hunt for ALP signals in the non-resonant regime, i.e. when the ALP is kinematically too light to be on-shell. We use high-energy LHC probes for this, and examine the Higgs-strahlung process and the production of the diboson and triboson final states. Working in a gauge-invariant framework, we obtain the upper limits on ALP couplings to the Higgs boson and the electroweak bosons from the reinterpretation of latest LHC Run II data. The constraints inferred on ALP couplings are very competitive for ALP masses up to 100 GeV. Projections for HL-LHC will also be discussed, demonstrating the power of future dedicated analyses at ATLAS and CMS.

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Session Classification: Poster Session 1