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Particle Physics at LPTHE

Mardi 22 Octobre 2024, 14 :00
LPTHE, Library and Zoom (link in the comments)
Domaines : hep-ph

Titre : *Impacts of Electroweak Symmetry Breaking on Axion-like Particles as Dark Matter*

Orateur : **Soumen Kumar Manna (IIT Guwahati)**

Résumé : *Axion-like particles (ALPs), the pseudo-Goldstone bosons arising from the spontaneous breaking of global symmetry, are promising contenders for dark matter. The most extensively studied ALP production mechanism is known as misalignment mechanism, where ALP is presumed to initially remain frozen at a point in the field space until it begins oscillating around the potential minimum and behaves as cold dark matter (CDM). The oscillation initiates once the universe Hubble expansion rate falls below the ALP mass, defining the oscillation frequency. In this work, we examine how electroweak symmetry breaking (EWSB) affects ALP evolution, specifically through a higher order Higgs portal interaction. The interaction is observed to contribute partially to the ALP's mass during EWSB, thus altering oscillation frequencies and influencing the correlation between the scale of symmetry breaking and its mass. The novelty of this study lies in broadening the parameter space satisfying correct CDM relic density, facilitating future exploration through a diverse range of experimental avenues.*