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Electroweak Multiplets as Dark Matter candidates: a brief review

Monday 7 July 2025 14:10 (20 minutes)

In this talk, I aim to present the phenomenology of Electroweak (EW) multiplets as potential Dark Matter (DM) candidates in the coming years. I will begin by discussing the thermal production mechanism in the early Universe and providing an overview of the current phenomenological landscape in the search for Weakly Interacting Massive Particles (WIMPs). It is worth emphasizing that WIMPs remain a compelling DM candidate with significant phenomenological implications for the foreseeable future. Next, I will outline the key properties of Electroweak multiplets as DM candidates, which serve as prototypical examples of WIMP DM. Specifically, I will detail the computation of thermal masses, including the impact of important non-perturbative, non-relativistic effects such as Sommerfeld enhancement and the formation of DM bound states. Finally, I will conclude by discussing the phenomenology of EW multiplets, highlighting the need for synergy between cosmological probes and a future muon collider to definitively address this important class of DM candidates.

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