ID de la contribución : **238**   Tipo : **Talk**

Producing Light Dark Matter at Fixed Target Experiments

jueves, 6 de noviembre de 2025 15:00 (15)

Sub-GeV, or light, dark matter (DM) has emerged as a compelling candidate for the observed DM in the universe. Unlike the canonical WIMP, light DM can account for the thermal relic abundance while evading nuclear recoil direct detection constraints, due to its limited momentum transfer. This motivates alternative search strategies, such as electron recoil direct detection and accelerator based experiments.

Upcoming experiments such as the Light Dark Matter eXperiment (LDMX) and the Search for Hidden Particles (SHiP), are projected to probe a broad range of dark matter scenarios, significantly extending the sensitivity frontier for light DM theories.

In this talk, we explore three main aspects in the context of DM at fixed target experiments: the methods for simulating expected signals, the vast theory landscape, and the implications of a potential DM signal.

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Clasificación de la sesión :   Connections to Particle Physics

Clasificación de temáticas :   Connections to particle physics