Phenomenology 2025 Symposium



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Kaluza-Klein portal dark matter models

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We revisit the phenomenology of dark matter (DM) scenarios within radius-stabilized Randall-Sundrum models. Specifically, we consider models where the dark matter candidates are Standard Model (SM) singlets confined to the TeV-brane and interact with the SM via spin-2 and spin-0 gravitational Kaluza-Klein (KK) modes. We compute the thermal relic density of DM particles in these models by applying recent work showing that scattering amplitudes of massive spin-2 KK states involve an intricate cancellation between various diagrams. Considering the resulting DM abundance, collider searches, and the absence of a signal in direct DM detection experiments, we show that spin-2 KK portal DM models are highly constrained. In particular, we confirm that within the usual thermal freeze-out scenario, scalar dark matter models are essentially ruled out. In contrast, we show that fermion and vector dark matter models are viable in a region of parameter space in which dark matter annihilation through a KK graviton is resonant.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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