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Analyzing Constraints on Simplified Dark Matter Models via Flavour and Electroweak Measurements

This study focuses on a combined analysis of various available inputs to constrain the parameter spaces of a simplified dark matter (SDM) model featuring a spin-0 mediator and fermionic dark matter (DM). The spin-0 mediator interacts with standard model (SM) fermions, SM gauge bosons, and DM. We constrain the parameter spaces of different relevant couplings, DM mass, and the mediator mass, using the data from flavour-changing charged and neutral current processes, CKM matrices, W and Z-pole observables, DM relic density, and direct and indirect detection bounds. We have calculated bounds on the couplings from both separate and simultaneous analyses of the mentioned processes. We identify correlated parameter spaces for all the relevant parameters, which include the couplings and the masses. For the DM and mediator masses, we have scanned the region between 100 GeV and 1000 GeV. Using our results, we have obtained bounds on the couplings of possible higher dimensional operators from which we can formulate our SDM.

Field of contribution

Phenomenology

Authors: Ms KOLAY, Lipika (IIT Guwahati);   Dr NANDI, Soumitra (IIT Guwahati)

Presenter: Ms KOLAY, Lipika (IIT Guwahati)

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