



Contribution ID: 459

Type: talk

Impact of Dark Matter Direct and Indirect Detection on simplified Dark Matter Models

Friday, July 24, 2015 4:45 PM (15 minutes)

We will analyze simple extensions of the Standard Model featuring a (fermionic) stable DM candidate and a mediator, a Z' or a scalar/pseudoscalar state, of its interactions with SM states. These kind of models result particularly manageable, because of the limited number of free-parameters, and offer a broad LHC phenomenology, ranging from mono-object sources to resonances in dileptons/dijets distributions, according to the dominant branching ratio of decay of the mediators. We will discuss the impact Direct and Indirect Dark Matter searches, assuming the latter to be thermal WIMPs. We will show in particular that the combinations of the limits on the DM Spin Independent and Spin Dependent scattering cross-section on nuclei already exclude large portions of the parameter space favored by DM relic density, in particular if, in addition, a DM Indirect signal, like the Galactic Center gamma-ray excess is required. We will then show how these constraints can provide indication on possible signals which can be tested at the LHC.

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Session Classification: Astroparticle Physics, Cosmology, Gravitation

Track Classification: Astroparticle Physics, Cosmology, Gravitation