## **Particle Physics Challenges**



Contribution ID: 111

Type: not specified

## Thermal DM beyond 100 TeV and Cosmic Rays

Thursday 27 September 2018 17:25 (15 minutes)

Constraining thermal DM above 100 TeV using Indirect Detection experiments is generally accepted to be either irrelevant or technically challenging. Irrelevant, because the unitarity of the S-matrix implies an upper bound on the thermal DM mass of order 100 TeV. Technically challenging, because the electroweak radiative corrections become non-perturbative above 100 TeV. We consider the class of models in which thermal DM annihilates into lighter mediators, themselves decaying into SM particles. In these models, not only the entropy dilution which results from the mediator decay can evade the unitarity bound on the DM mass but also the scaled-down electroweak radiative corrections allow to reliably compute the energy spectra of the SM final states. Considering for definiteness a model of dark U(1) DM, we compute the Indirect Detection constraints coming from various high-energy telescopes observing gamma-rays, neutrinos and charged cosmic-rays, taking into account the full Sommerfeld effects with a finite mediator mass.

Primary author:GOUTTENOIRE, Yann (DESY)Presenter:GOUTTENOIRE, Yann (DESY)Session Classification:Parallel Session: Cosmo 5

Track Classification: Cosmology & Astroparticle Physics