Contribution ID: **84** Type: **not specified**

Thermal WIMPs and the scale of new physics

Monday, 23 August 2021 17:00 (20 minutes)

The non-observation of conclusive WIMP signals raises the question whether WIMPs can still account for the dark matter of the universe. In this talk I will present results from a global analysis of effective field theory operators describing the interactions between WIMPs and Standard Model particles. In this bottom-up approach, the global fitting framework GAMBIT is used to simultaneously vary the coefficients of 14 such operators, along with the WIMP mass, the scale of new physics and several nuisance parameters. The likelihood functions include the latest data from Planck, direct and indirect detection experiments, and the LHC. Although the observed relic density can be reproduced in large regions of parameter space, there cannot be a large hierarchy between the WIMP mass and the scale of new physics, which raises concerns about the validity of the effective field theory. I will discuss possible ways to address this issue in order to consistently interpret the latest results from WIMP searches at the LHC.

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Session Classification: Dark Matter and Astroparticle Physics

Track Classification: Dark Matter and Astroparticle Physics