Contribution ID: **125** Type: **not specified**

Studying dark matter with MadDM: Lines and loops

Monday 22 November 2021 13:20 (20 minutes)

Automated tools for the computation of amplitudes and cross sections have become the backbone of phenomenological studies beyond the standard model. We present the latest developments in MadDM, a calculator of dark-matter observables based on MadGraph5_aMC@NLO. The new version enables the fully automated computation of loop-induced annihilation processes, relevant for indirect detection of dark matter. Of particular interest is the electroweak annihilation into γX, where $X = \gamma, Z, h$ or any new unstable particle even under the dark symmetry. These processes lead to the sharp spectral feature of monochromatic gamma lines: a smoking-gun signature for dark matter annihilation in our Galaxy. MadDM provides the predictions for the respective fluxes near Earth and derives constraints from the gamma-ray line searches by Fermi-LAT and HESS. As an application, we present the implications for the parameter space of the Inert Doublet model and a top-philic t-channel mediator model.

Authors: ARINA, Chiara (CP3 UCLouvain); MASSARO, Daniele (Alma Mater Studiorum - Università di Bologna / Université Catholique de Louvain); MALTONI, Fabio (Universite Catholique de Louvain (UCL) (BE) and Università di Bologna); HEISIG, Jan (Université catholique de Louvain (UCL)); MATTELAER, Olivier (UCLouvain)

Presenter: MASSARO, Daniele (Alma Mater Studiorum - Università di Bologna / Université Catholique de Louvain)

Session Classification: Dark Matter

Track Classification: Dark matter