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Attacking QCD uncertainties in Monte Carlo event generators for gamma-ray dark matter searches

Monday 23 July 2018 16:00 (20 minutes)

We discuss QCD uncertainties in the modelling of the gamma-ray energy spectra from Dark-Matter (DM) annihilation in the galaxy center and beyond.

Dark Matter particles, being neutral, cannot couple directly to photons.

Photons are instead produced as the result of the fragmentation and decay of the particles the DM annihilates into.

In phenomenological studies the photons energy spectra are typically computed using Monte Carlo event generators.

These results have however intrinsic uncertainties due to the specific model used and the choice in model parameters, which are difficult to assess and which are typically neglected.

We derive a new set of hadronisation parameters (tune) for the Pythia8 Monte Carlo generator from a fit to LEP data at the Z peak.

For the first time we derive a conservative set of uncertainties on the shower and hadronisation model parameters.

Their impact on the gamma-ray energy spectra from DM annihilation into different SM particles is evaluated.

The spectra and their uncertainties are provided in tabulated form for future use.

Parallel Session

Dark Matter, Astroparticle Physics

Primary authors: AMOROSO, Simone (Deutsches Elektronen-Synchrotron (DE)); SKANDS, Peter (Monash University (AU)); RUIZ DE AUSTRI, Roberto; CARON, Sascha (Nikhef National institute for subatomic physics (NL)); JUEID, Adil (Faculty of Sciences and Techniques, Tangier)

Presenter: AMOROSO, Simone (Deutsches Elektronen-Synchrotron (DE))

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