

# Dark Showers with the Herwig Generator

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Most dark matter searches at the LHC focus on models where dark matter is a single stable particle, leading to traditional “MET+X” type searches. However recent years have shown a growing interest in “dark sector” which have a more complex internal structure. One such model is “dark showers”, in which the particles in the dark sector interact with each other via a strong force similar to QCD in the Standard Model, which leads to the formation of “dark hadrons”, some of which are stable DM candidates, and others of which decay to SM particles. This can give rise to unconventional experimental signatures, such as semi-visible and emerging jets.

Accurately simulating these dark showers is challenging since the hadronisation step is non-peturbative, and described by semi-empirical models, which require tuning to Standard Model data. However so far no extensive studies have been performed to determine the impact of hadronisation uncertainties on these types of models. In this talk I will describe the implementation of this dark shower model into the Herwig 7 Monte Carlo generator, where this can improve on the predictions in the existing Pythia hadronisation model, and how one can use variations of the Herwig hadronisation parameters to obtain an estimate of the hadronisation uncertainties for these dark shower models.