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Next-to-leading order calculations matched to parton showers for supersymmetry and dark matter

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The ATLAS and CMS collaborations are extensively investigating many different channels in order to get hints for new physics. Many of these searches are currently based on Monte Carlo simulations of the signals where leading-order matrix elements of different partonic multiplicities are matched to parton showers and merged. More sophisticated differential theoretical predictions are however always helpful for setting more accurate exclusion limits, possibly refining the search strategies, and measuring the model free parameters in case of a discovery. In this talk, I will discuss how the MadGraph5_aMC@NLO framework can provide a general platform for computing (differential) observables matching next-to-leading order accurate predictions to parton showers. This will be illustrated through specific examples in the context of dark matter simplified models and supersymmetry.

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