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Underlying Event Tuning for VINCIA

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Underlying event (UE) modelling is crucial at the LHC, for both precision Standard Model measurements and understanding of soft QCD phenomenology. In recent years, an emergence of newer, improved parton shower models in Monte Carlo generators were seen. One such model is VINCIA, an antenna-based parton shower model that was developed as a plug-in to Pythia. Incorporating both soft and collinear limits of QCD via the antenna functions, VINCIA is expected to handle colour coherence better. This study is the first attempt to develop an ATLAS dedicated tune for VINCIA, with the specific aim of improving the modelling of UE.
This talk will present the state of the tuning study at the time of the NExT PhD Workshop. At the time of submitting this abstract, an initial tune involving multiple parton interactions and colour reconnection parameters has been done and an improvement in the modelling of UE-sensitive observables has been obtained. The tune will be extended to include more parameters and distributions, while the usage of MiNNLO will be investigated so that QCD calculations at NNLO can be matched to parton showers.

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