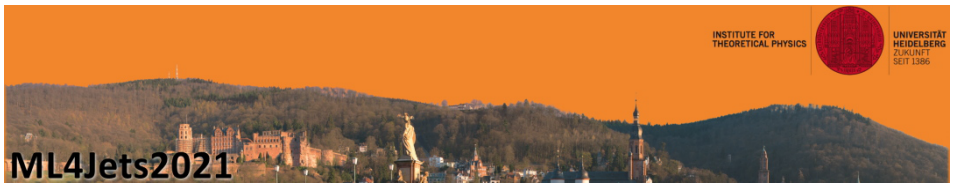

Contribution ID: **62** Type: **not specified**

Boosting new physics sensitivity with Variational Autoencoders

Tuesday, July 6, 2021 4:40 PM (20 minutes)

We show how an anomaly detection algorithm could be integrated in a typical search for new physics in events with jets at the CERN Large Hadron Collider (LHC). We assume that an anomaly detection algorithm is given, trained to identify rare jet types, such as jets originating from the decay of a highly boosted massive particle. We demonstrate how this algorithm could be integrated in a search without disrupting the background-estimate strategy while enhancing the sensitivity to new physics. As an example, we consider convolutional variational autoencoders (VAEs) applied to dijet events. The proposed procedure can be generalized to any final state with jets. Once applied to real data, it could contribute to extend the sensitivity of the LHC experiments to previously uncovered new physics scenarios, e.g. broad-resonance and non-resonant jet production from new physics processes.

Affiliation

CERN, University of Vienna

Academic Rank

Primary authors: WOZNIAK, Kinga Anna (University of Vienna (AT)); PIERINI, Maurizio (CERN); NGADIUBA, Jennifer (FNAL); AARRESTAD, Thea (CERN); NGUYEN, Thong (California Institute of Technology (US)); DUARTE, Javier Mauricio (Univ. of California San Diego (US))

Presenter: WOZNIAK, Kinga Anna (University of Vienna (AT))

Session Classification: BSM