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Type: **Parallel session talk**

The Dark Machines Anomaly Score Initiative: Benchmark Data and Model Independent Classification for the Large Hadron Collider

Wednesday 28 July 2021 17:15 (15 minutes)

We describe the outcome of a data challenge to detect signals of new physics at the LHC using unsupervised machine learning algorithms conducted as part of the Dark Machines Initiative and the Les Houches 2019 workshop on Physics at TeV colliders. We first define and describe a large benchmark dataset, consisting of > 1 Billion simulated LHC events corresponding to 10 fb^{-1} of proton-proton collisions at a center-of-mass energy of 13 TeV. We then review a wide range of anomaly detection and density estimation algorithms, developed in the context of the data challenge, and we measure their performance in a set of realistic analysis environments. We draw a number of useful conclusions that will aid the development of unsupervised new physics searches during the third run of the LHC, and provide our benchmark dataset for future studies.

Collaboration / Activity

Dark Machines Initiative

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