Contribution ID: **510** Type: **Poster**

Unsupervised tagging of semivisible jets with normalized autoencoders in CMS

Semivisible jets are a novel signature of dark matter scenarios where the dark sector is confining and couples to the Standard Model via a portal. They consist of jets of visible hadrons intermixed with invisible stable particles that escape detection. In this work, we use normalized autoencoders to tag semivisible jets in proton-proton collisions at the CMS experiment. Normalized autoencoders are unsupervised machine learning models that learn to compress and reconstruct jet information through an energy-based loss function, preventing spurious reconstruction of jets outside the training set, a common failure mode of autoencoders. Unsupervised models are desirable in this context since they can be trained on background only, and are thus robust with respect to the details of the signal modelling. We show that normalized autoencoders can efficiently discriminate semivisible jets from standard QCD and (anti)top jets based on their anomalous jet substructure. We demonstrate the performance of our method on benchmark models of semivisible jets produced via t-channel processes.

Collaboration / Activity

CMS

Primary author: EBLE, Florian (ETH Zürich)

Presenter: EBLE, Florian (ETH Zürich)

Session Classification: Poster session

Track Classification: Searches for New Physics