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A generative model for jet substructure

We introduce a generative model to simulate radiation patterns within a jet using the Lund Jet plane. We show that using an appropriate neural network architecture with a probabilistic generation of images, it is possible to construct a model which retrieves the underlying two-dimensional distribution within a few percent. We compare this method with several alternative state-of-the-art generative techniques. Finally, we show how a mapping can be created between different categories of jets, and use this method to retroactively change simulation settings or the underlying process of an existing sample. These results provide a framework for data augmentation of physical measurements, as well as a significant reduction in simulation time through fast inference of the neural network.

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