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Lund jet images from generative and cycle-consistent adversarial networks

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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 stochastic generation of images, it is possible to construct a generative model which retrieves the underlying two-dimensional distribution to within a few percent. We compare our model 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 on an existing sample. These results provide a framework for significantly reducing simulation times through fast inference of the neural network as well as for data augmentation of physical measurements.

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