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## Application of Generative Adversarial Networks (GANs) to jet images

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<https://arxiv.org/abs/1701.05927>

We provide a bridge between generative modeling in the Machine Learning community and simulated physical processes in High Energy Particle Physics by applying a novel Generative Adversarial Network (GAN) architecture to the production of jet images – 2D representations of energy depositions from particles interacting with a calorimeter. We propose a simple architecture, the Location-Aware Generative Adversarial Network, that learns to produce realistic radiation patterns from simulated high energy particle collisions. The pixel intensities of GAN-generated images faithfully span over many orders of magnitude and exhibit the desired low-dimensional physical properties (i.e., jet mass, n-subjettiness, etc.). We shed light on limitations, and provide a novel empirical validation of image quality and validity of GAN-produced simulations of the natural world. This work provides a base for further explorations of GANs for use in faster simulation in High Energy Particle Physics.

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