

# Towards Designing and Exploiting Generative Networks for Neutrino Physics Experiments using Liquid Argon Time Projection Chambers

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We put forth a technique to generate images of particle trajectories (particularly electrons and protons) in a liquid argon time projection chamber (LArTPC). LArTPCs are a type of particle physics detector used by several current and future experiments focused on studies of the neutrino. We implement a quantized variational autoencoder and an autoregressive model which produces images conditioned on momentum with LArTPC like features. In this paper, we adopt a hybrid approach to generative modeling via combining the decoder from the autoencoder together with an explicit generative model for the latent space to produce momentum-conditioned images of particle trajectories in a LArTPC.

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