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Generative Adversarial Networks for scintillation light simulation in EXO-200 SHAOLEI LI, University of Illinois at Urbana-Champaign, EXO-200 COLLABORATION — The Enriched Xenon Observatory (EXO-200) was an experiment in particle physics aiming to detect neutrinoless double beta decay using about 130 kg of xenon (Xe) enriched in the isotope 136. In the experiment, avalanche photodiodes (APDs) are used to convert Xe scintillation light into electrical signals. Simulations of light signals of APDs in the detector are computationally time-consuming and cannot accurately reflect the experimental data due to unknown material optical properties and geometry. A new approach to fast simulations are generative models, which use deep neural networks to generate detector events that resemble real data. We use EXO-200 experiment data for adversarial training of a generator network and a critic network guided by the Wasserstein distance. The generator is constrained during the training such that the generated APD waveforms show the expected dependency on the initial energy and the deposition positions. Preliminary results of the study will be discussed in the talk.

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