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Machine learning for particle physics simulations

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Accurate detector simulations are key components of any measurement or search for new physics. Due to their stochastic nature, ML-based generative models are natural opportunities for fast, differentiable simulations. We present two such graph- and attention-based models for generating LHC-like data using sparse and efficient point cloud representations, with state-of-the-art results. We measure a three-orders-of-magnitude improvement in latency compared to LHC full simulations, and also discuss recent work on evaluation metrics for validating such ML-based fast simulations.

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