Contribution ID: **43**   Type: **Regular talk**

Hadrons, Better, Faster, Stronger

Tuesday 10 May 2022 16:20 (25 minutes)

Precise modeling of physical processes is a crucial part of modern particle physics. However simulation of particle showers within a calorimeter requires significant computational resources. Fast and exact machine-learning-based shower simulators offer a promising way of alleviate this problem.

This work reports progress on two important fronts. First, the WGAN and BIB-AE generative models, previously investigated for photon showers, are improved and demonstrated to successfully learn hadronic showers initiated by charged pions in a segment of the hadronic calorimeter of the International Large Detector (ILD). Second, we consider how state-of-the-art reconstruction software applied to generated shower energies affects the obtainable energy response and resolution.

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Session Classification: Workshop