Contribution ID: **107**   Type: **Poster (from contributed talk)**

A Deep Generative Model for Hadronization - Poster

Wednesday 31 January 2024 17:20 (5 minutes)

Hadronization is a critical step in the simulation of high-energy particle and nuclear physics experiments. As there is no first principles understanding of this process, physically-inspired hadronization models have a large number of parameters that are fit to data. We propose an alternative approach that uses deep generative models, which are a natural replacement for classical techniques, since they are more flexible and may be able to improve the overall precision. We first demonstrate using neural networks to emulate specific hadronization when trained using the inputs and outputs of classical methods. A protocol is then developed to fit a deep generative hadronization model in a realistic setting, where we only have access to a set of hadrons in data. Finally, we build a deep generative hadronization model that includes both kinematic (continuous) and flavor (discrete) degrees of freedom. Our approach is based on Generative Adversarial Networks and we show the performance within the context of the cluster model within the Herwig event generator.

Would you like to be considered for an oral presentation?

Authors: KANIA, Adam; SIODMOK, Andrzej Konrad (Jagiellonian University (PL)); NACHMAN, Ben (Lawrence Berkeley National Lab. (US)); CHAN, Jay (Lawrence Berkeley National Laboratory); JU, Xiangyang (Lawrence Berkeley National Lab. (US))

Presenter: CHAN, Jay (Lawrence Berkeley National Laboratory)

Session Classification: Poster Session

Track Classification: 3 ML for simulation and surrogate model : Application of Machine Learning to simulation or other cases where it is deemed to replace an existing complex model