Contribution ID: **166** Type: **Poster**

CaloClouds3; Diffusion and normalising flows

This contribution presents the final iteration of the CaloClouds series. Simulation of photon showers in the granularities expected in a future Higgs factory is computationally challenging. A viable simulation must capture the find details exposed by such a detector, while also being fast enough to keep pace with the expected rate of observations. The Caloclouds model utilises point cloud diffusion and normalising flows to replicate MCMC simulation with exceptional actuary. First we will make a lightning overview of the models objectives and constraints. To describe the upgrades for the latest version, we detail the studies on the flow model and the optimisations made, and then summarise the steps taken to generalise CaloClouds 3 for using in the whole detector. Considering some of the underlying principles of model design, we look at the significance of the data format choice on model outcomes. Finally, we present the results of reconstructions performed on CaloClouds 3 output against the results from Geant4 simulation, thus demonstrating that this model provides reliable physics reproductions.

Significance

This model has been finalised. The improvements made are exhaustive, and we have confidence that this represents the best possible performance for the current architecture. With significant work, we now have a global implementation, for use across the whole calorimeter. This allows us to finalise the series by demonstrating faithful, higher level reconstructed quantities against Geant4 simulation.

References

https://arxiv.org/pdf/2309.05704

Experiment context, if any

International Large detector; https://www.ilcild.org/

Authors: KOROL, Anatolii (Deutsches Elektronen-Synchrotron (DESY)); GAEDE, Frank-Dieter (Deutsches Elektronen-Synchrotron (DE)); KASIECZKA, Gregor (Hamburg University (DE)); DAY-HALL, Henry (DESY); VALENTE, Lorenzo (University of Hamburg); MCKEOWN, Peter (CERN); BUSS, Thorsten Lars Henrik (Universität Hamburg)

Presenter: DAY-HALL, Henry (DESY)

Session Classification: Poster session with coffee break

Track Classification: Track 2: Data Analysis - Algorithms and Tools