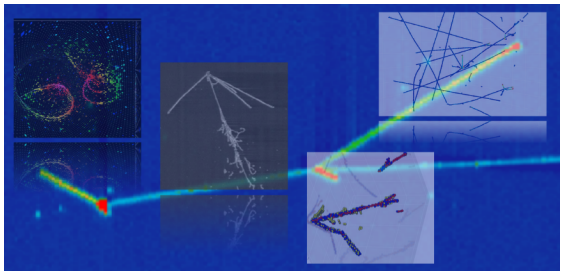

Contribution ID: **5** Type: **Short talk (15min. + 5 min. Q/A)**

Treating Detector Systematics via a Likelihood Free Inference Method

Friday 31 October 2025 13:35 (15 minutes)

Quantifying systematic uncertainties in particle physics analyses is complicated by the need to estimate detector responses through Monte Carlo (MC) simulations. Conventional approaches compute variations in reconstructed variables under fixed physics assumptions, which can bias the parameters being measured. We present a likelihood-free inference method that uses neural networks to derive event-wise reweighting factors from MC simulations of varied detector realizations. These weights describe how detector response changes with detector properties, independent of any physics model. Applied to a simplified neutrino oscillation experiment, the method cleanly separates detector modeling from physics parameter estimation in MC forward-folding analyses.

Presenter: TRETTIN, Alexandra

Session Classification: Neural Inference Techniques