dSiPM Study & Initial Attempt at Energy Reconstruction

CNN Performance

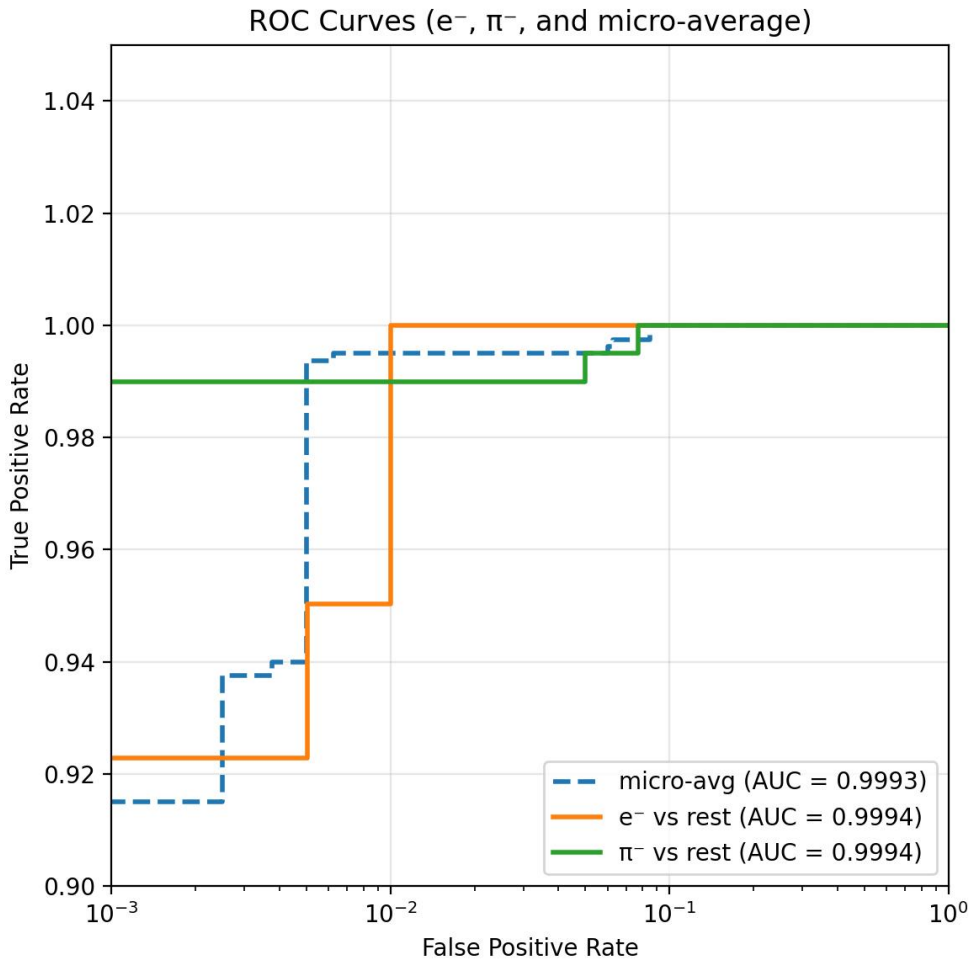
Liangyu Wu

11 June 2025

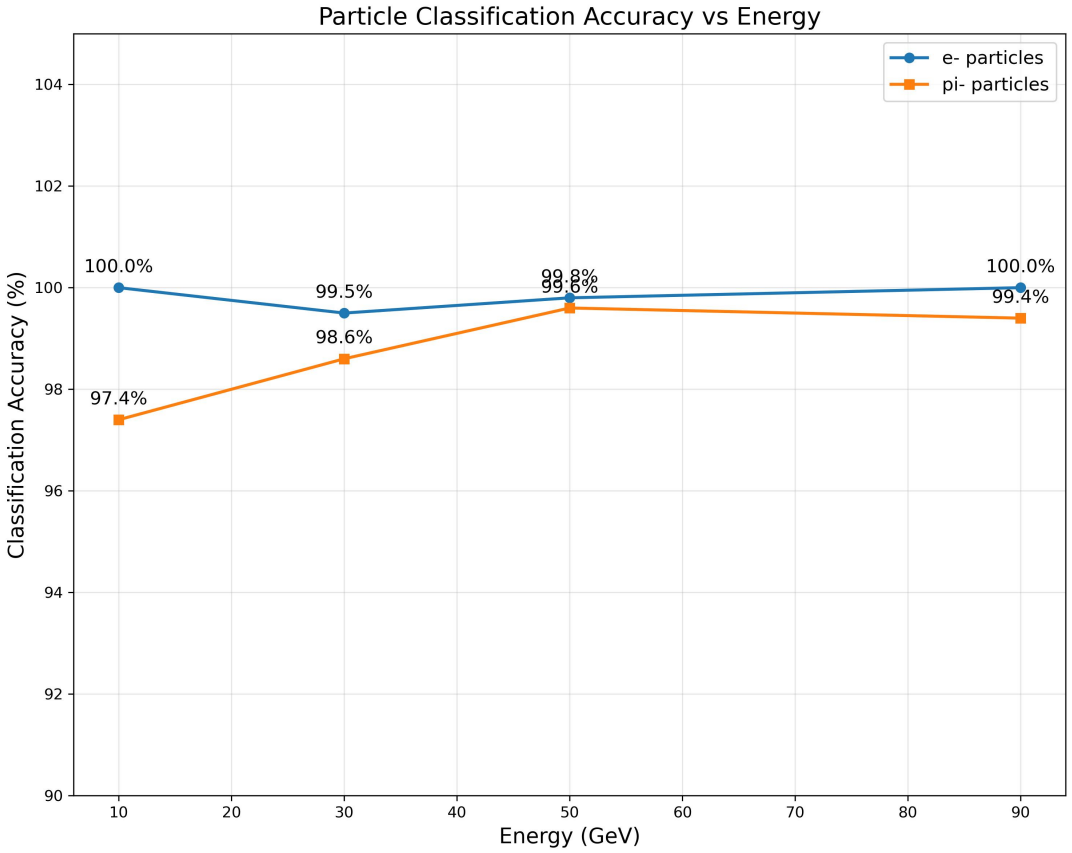
SLAC NATIONAL ACCELERATOR LABORATORY

Stanford University | U.S. DEPARTMENT OF ENERGY

Particle ID

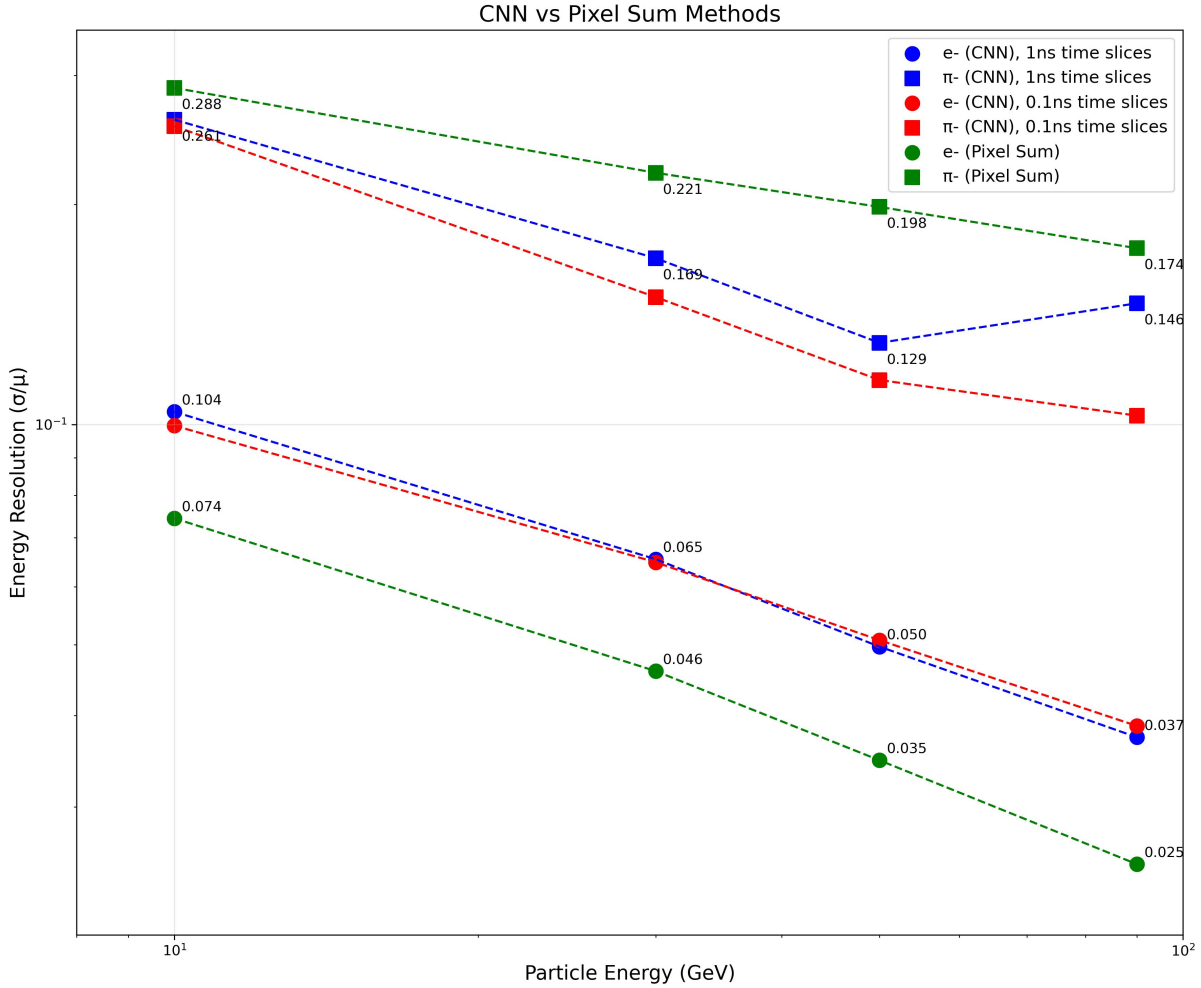


- Exceptional particle discrimination with AUC>0.999, achieving >95% sensitivity at <1% false positive rate.



Particle Energy Reconstruction

Energy Resolution Summary



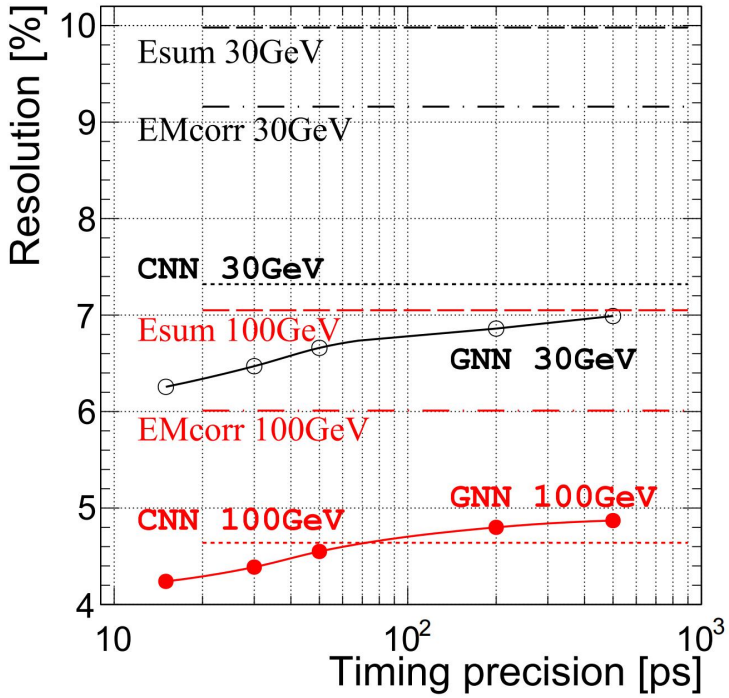
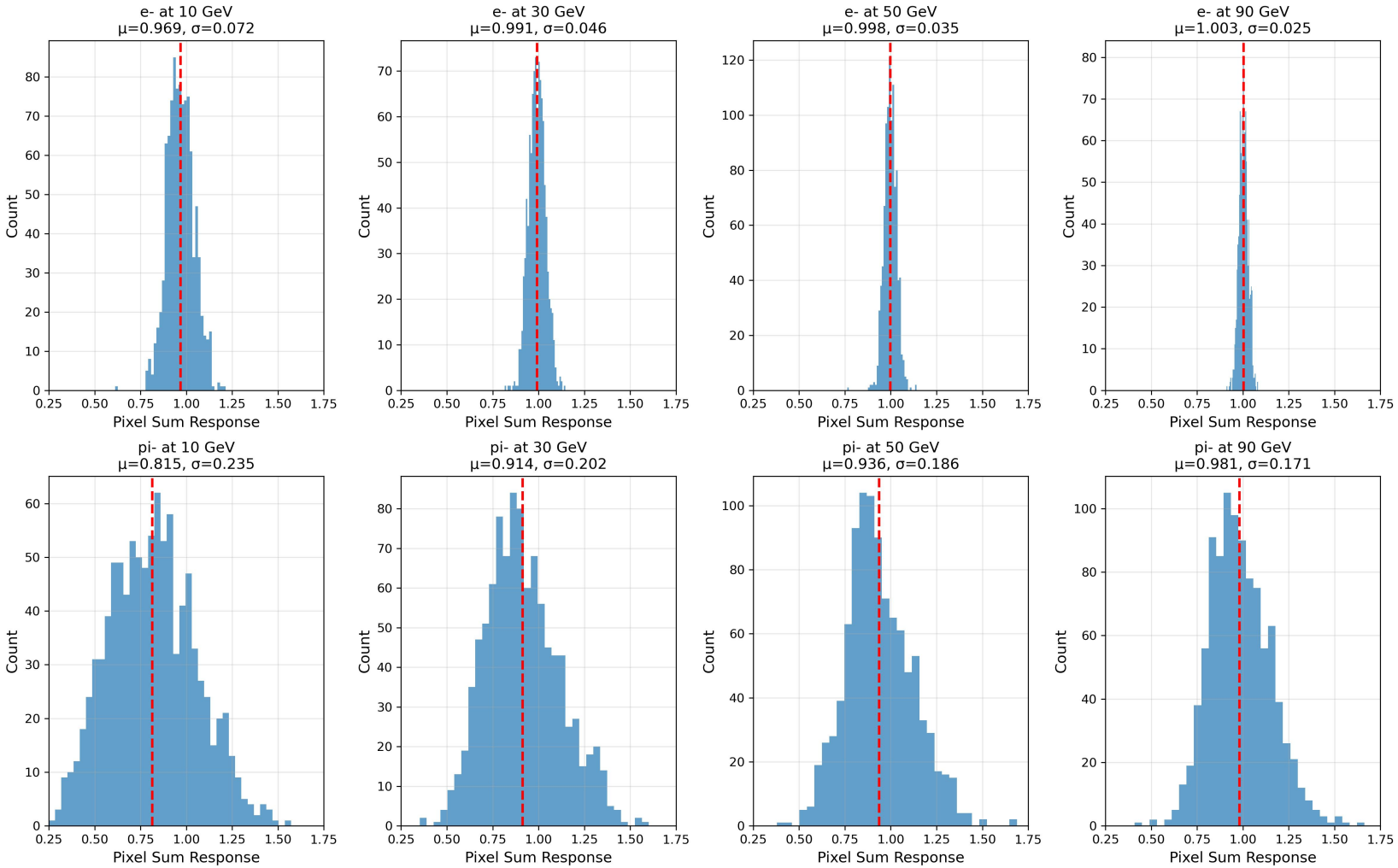
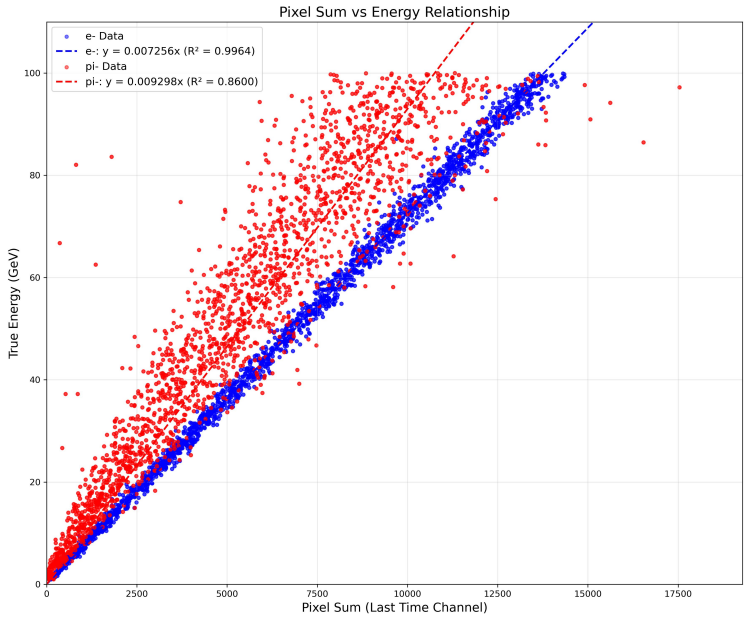


Figure 11. The energy resolution (σ/E) for 30 GeV (black) and 100 GeV (red) pions. Simple energy sum (Esum), f_{em} corrected energy sum (EMcorr), CNN and GNN reconstruction techniques. The horizontal axis indicates the assumed timing precision for the GNN technique. The energy resolutions obtained from different reconstruction techniques are also shown for comparison.

Particle Energy Reconstruction

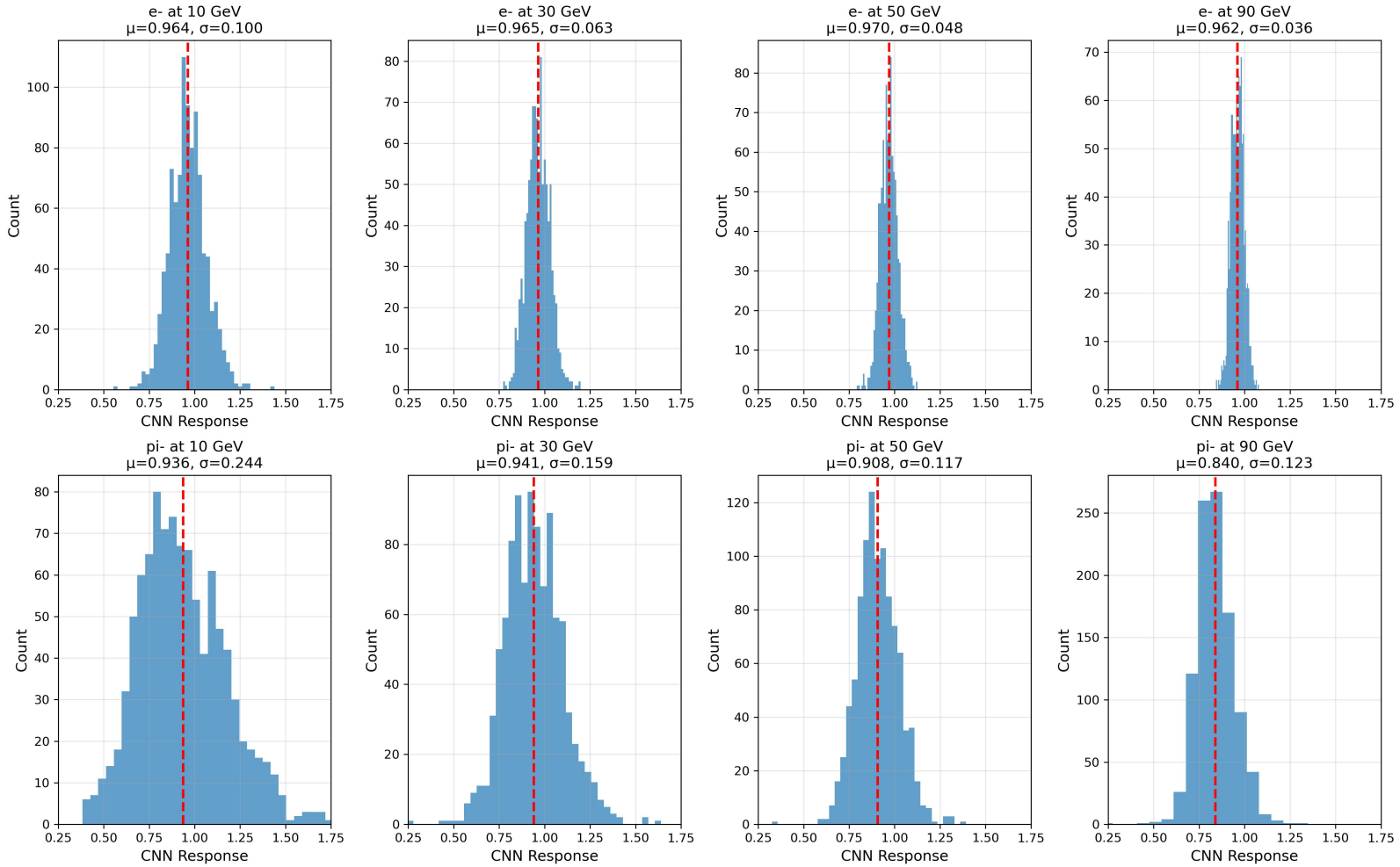
Linear Calibrated Response





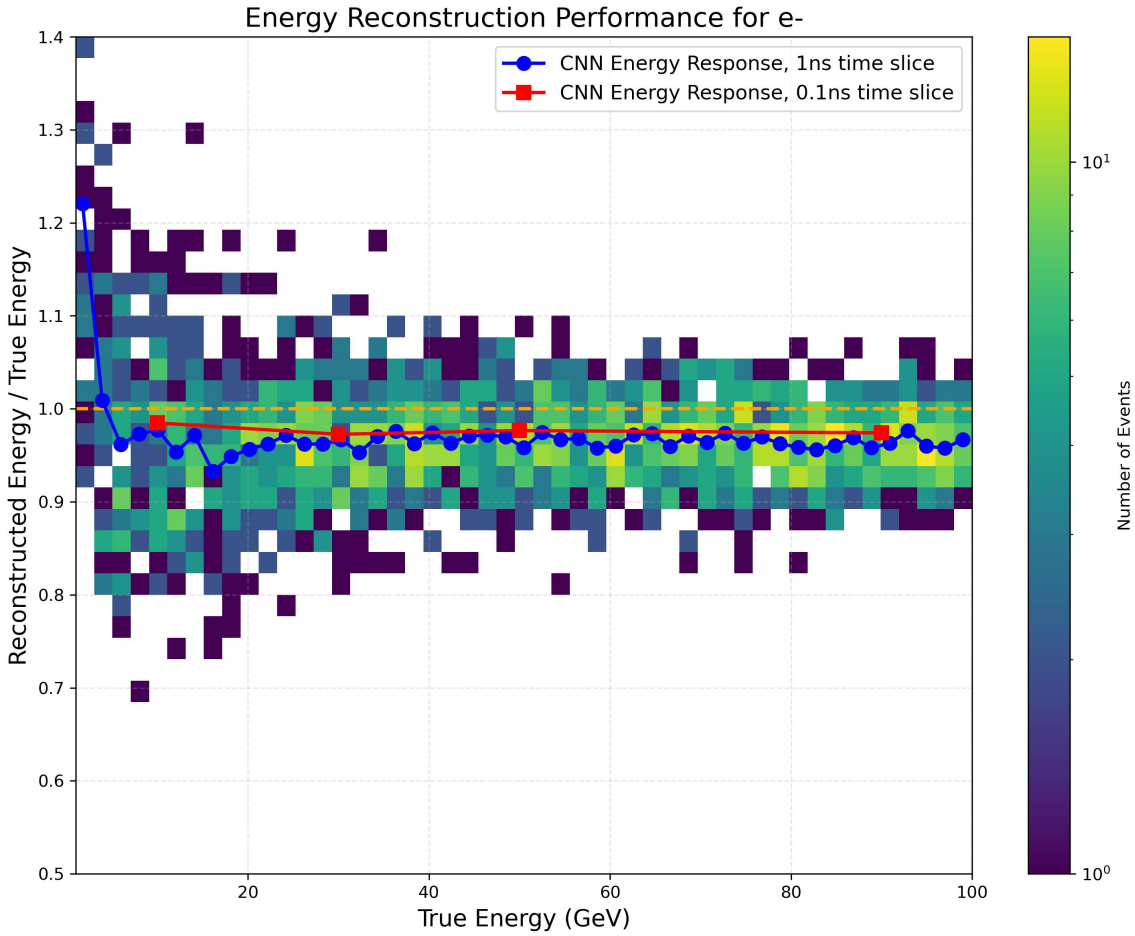
Particle Energy Reconstruction

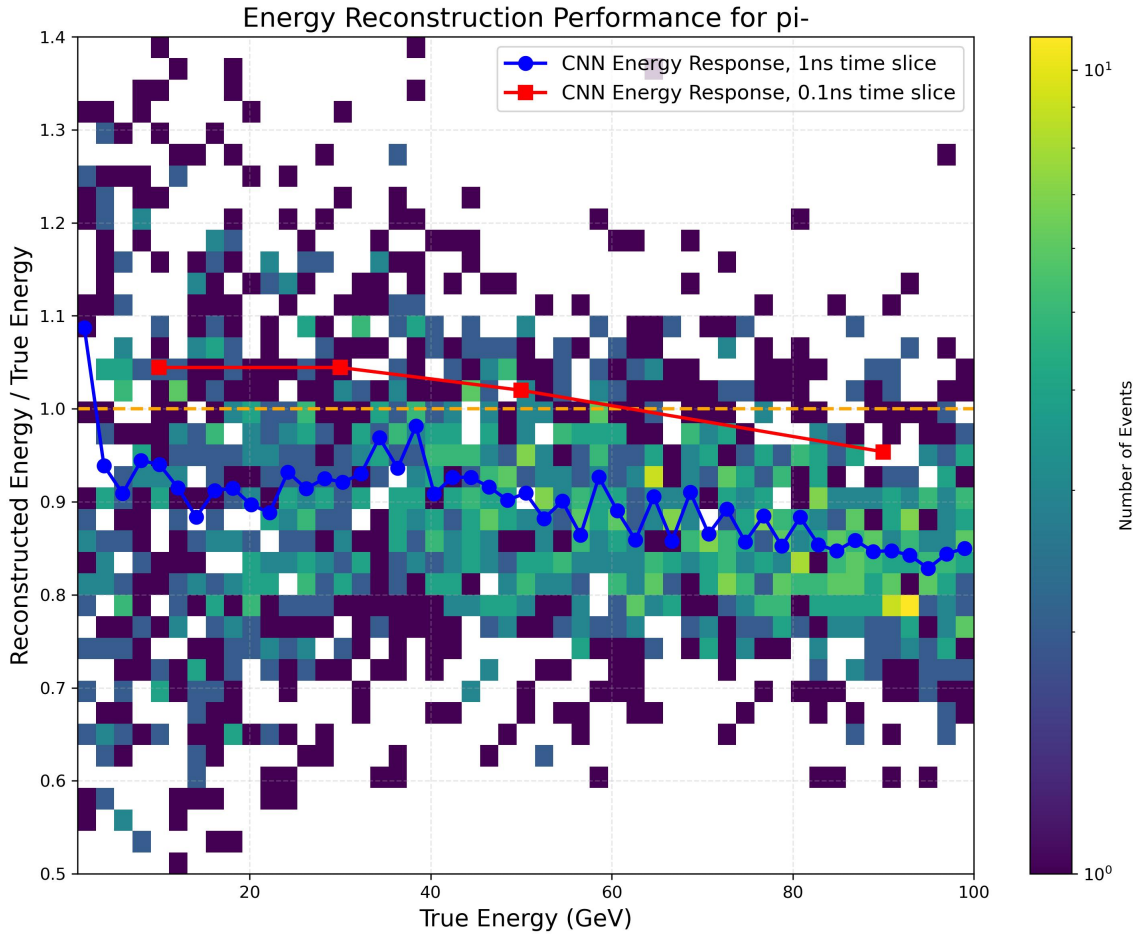
CNN Response (1ns)



Particle Energy Reconstruction

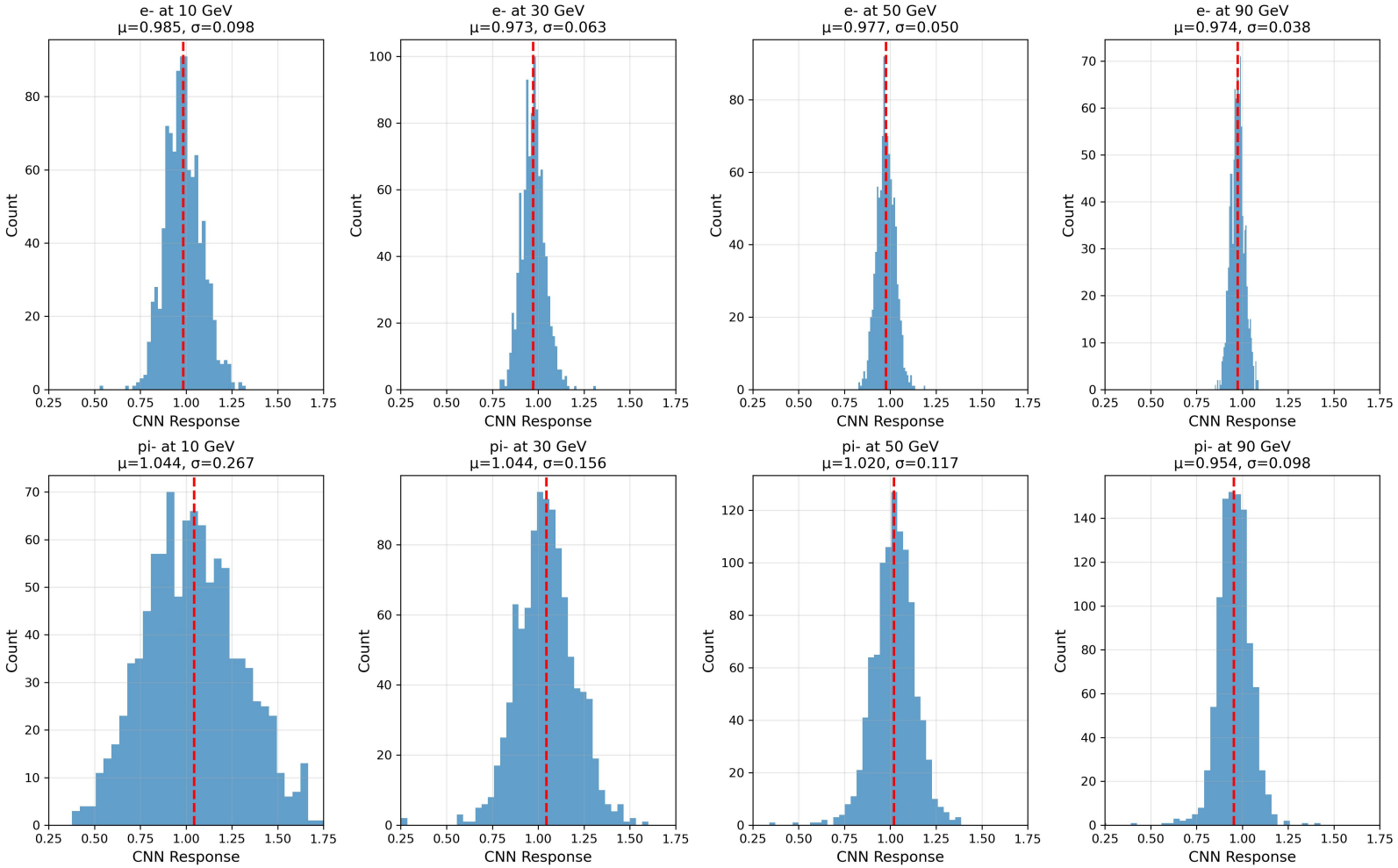
CNN Response (1ns)





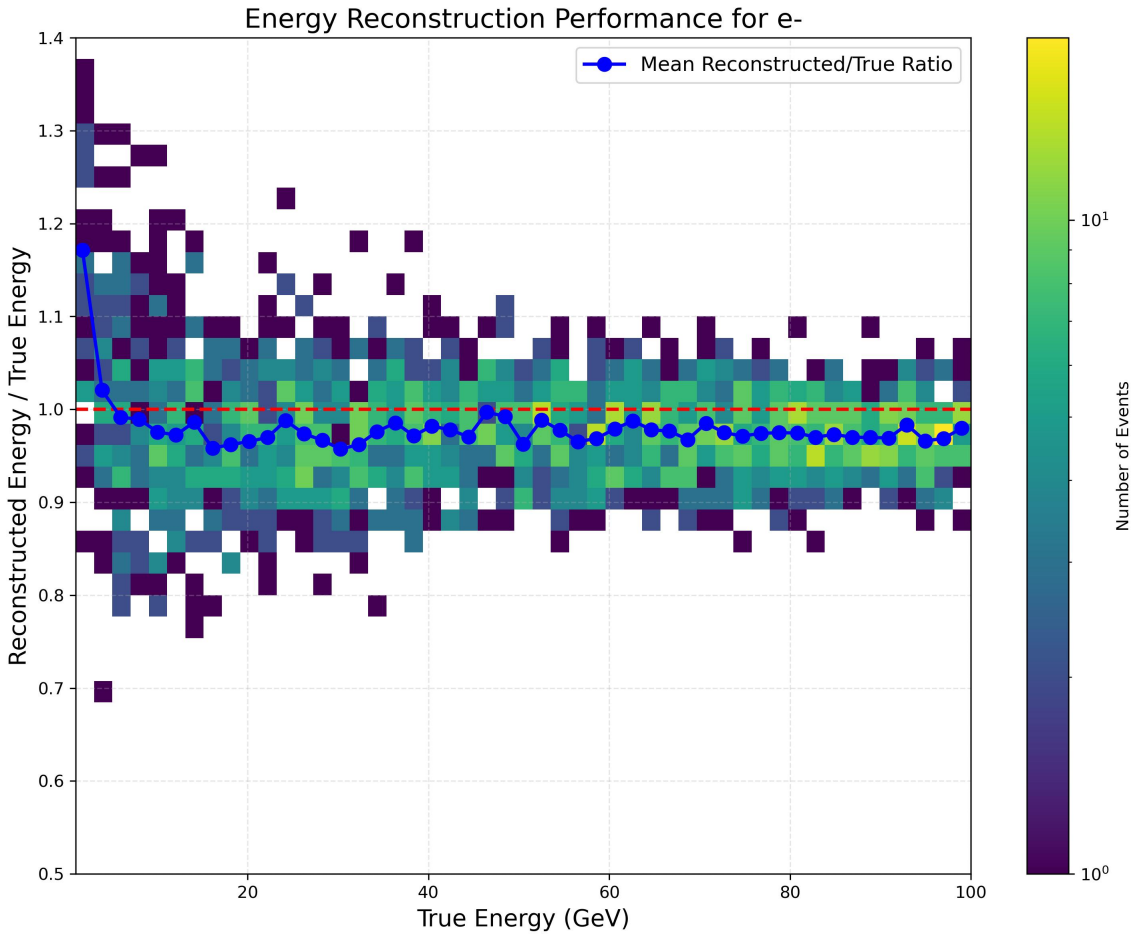
Particle Energy Reconstruction

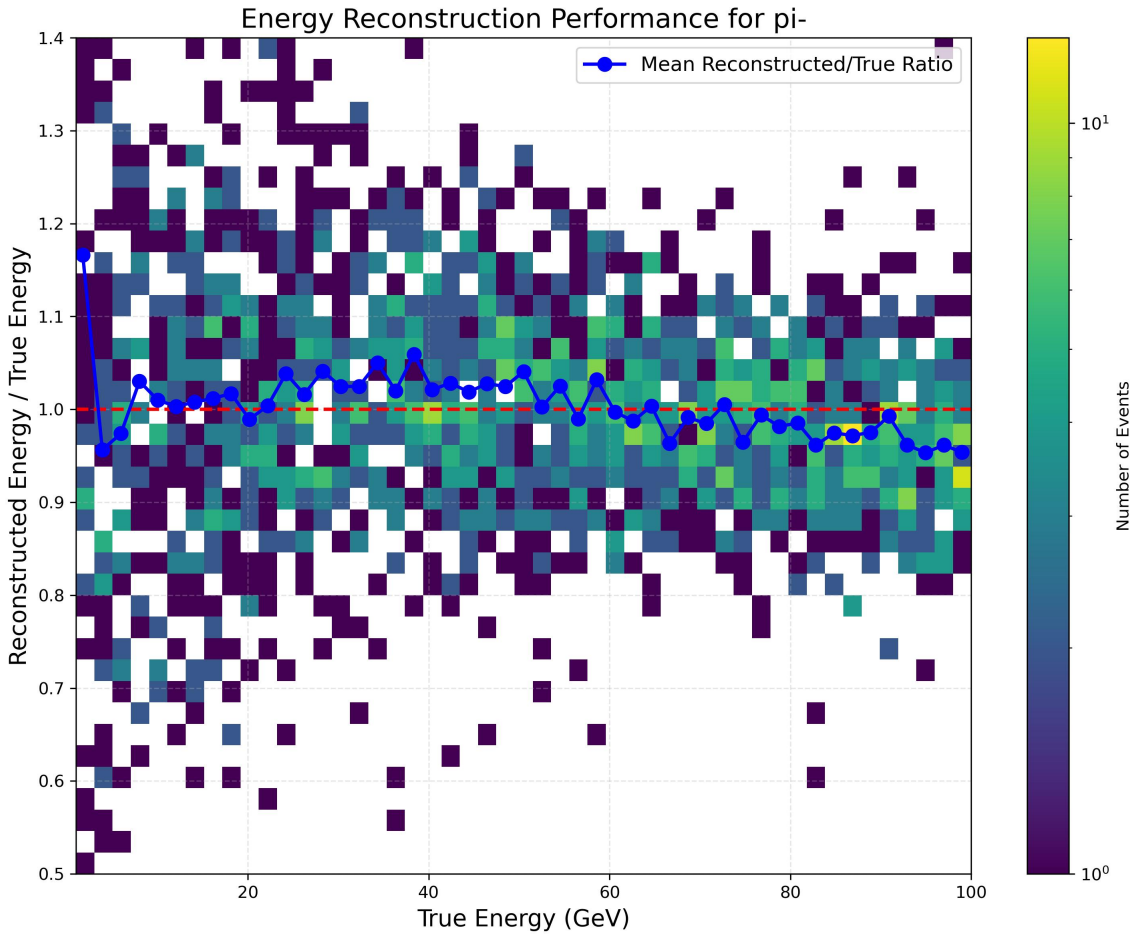
CNN Response (0.1ns)



Particle Energy Reconstruction

CNN Response (0.1ns)





Back ups

Particle Energy Reconstruction

CNN Response (0.1ns)