

# GNN fit robustness

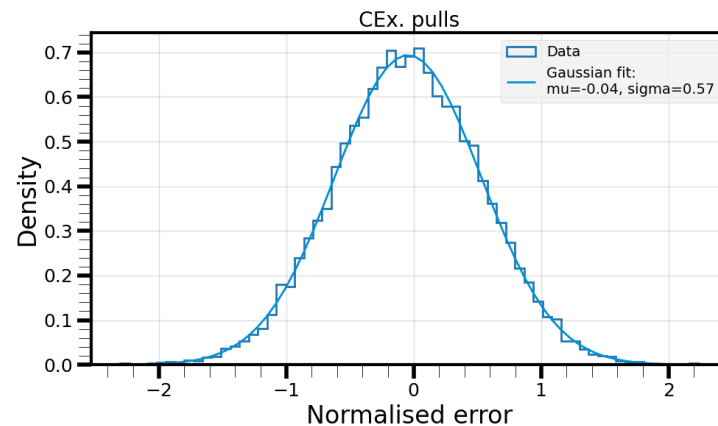
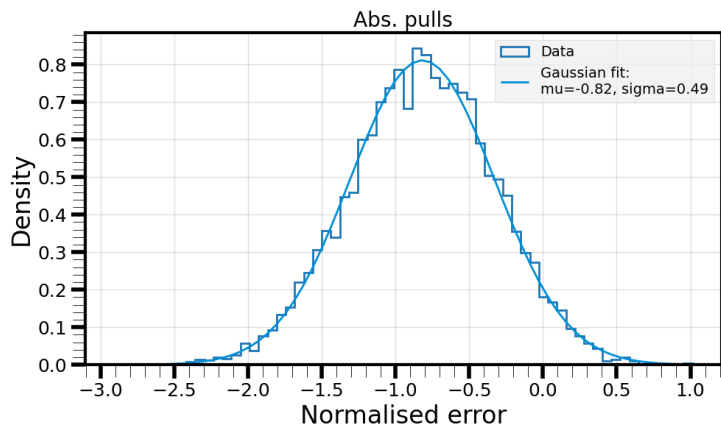
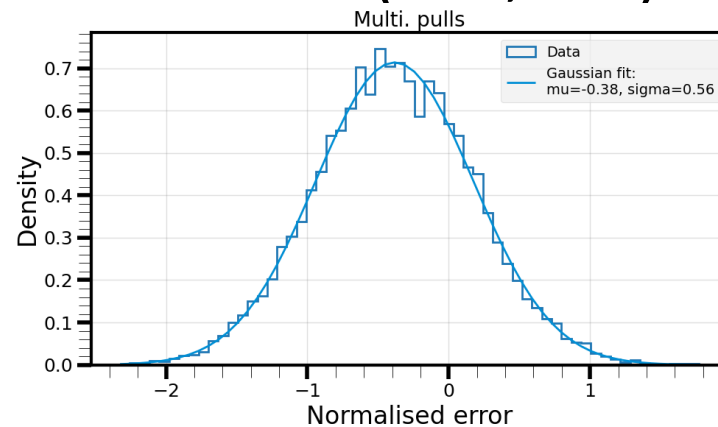
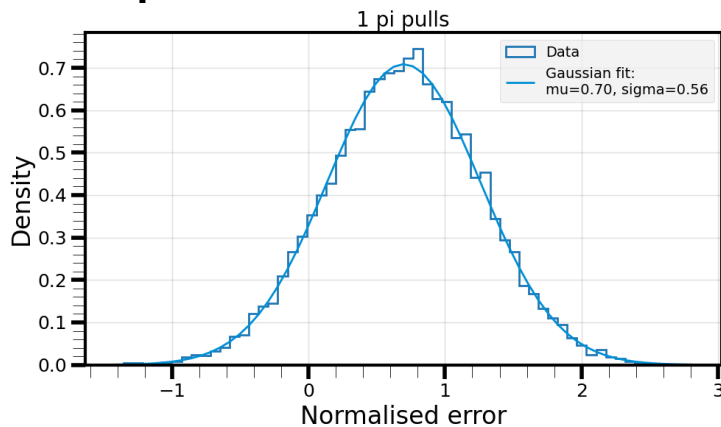
30.08.24

# Tests

- Random fluctuation
- Initial fit predictions
- Re-weighted process fractions
- GNN score drift – some form of smearing the underlying distributions
- Outliers
- Minimum required statistics

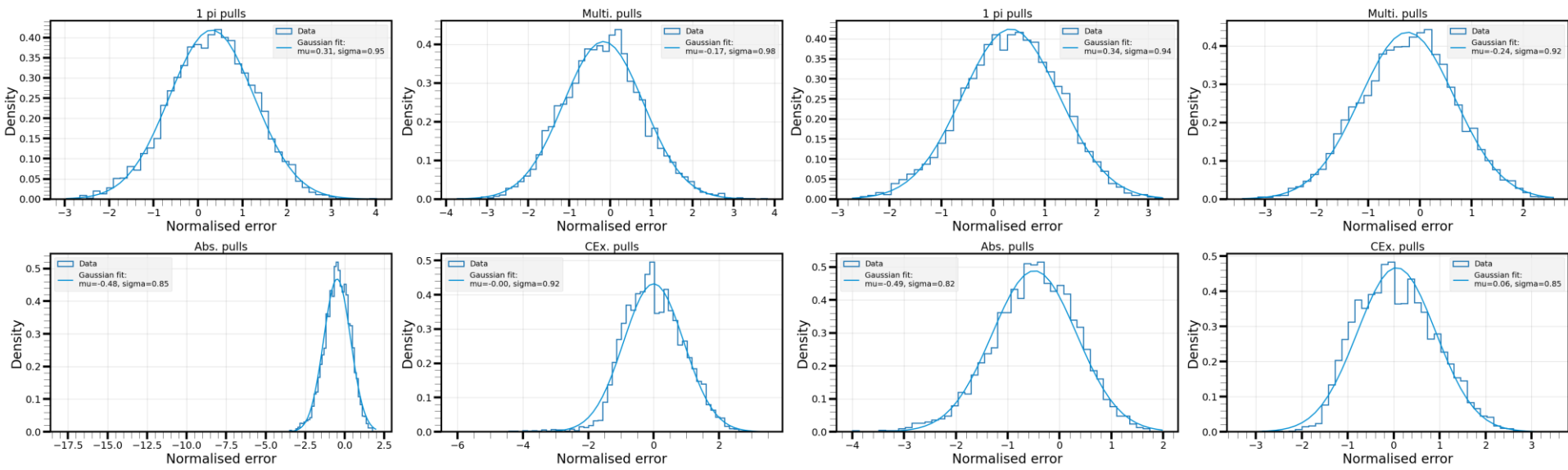
# Baseline

- Use a full MC file as template
- Sample 50% of the “data” MC file  $N (=10,000)$  times



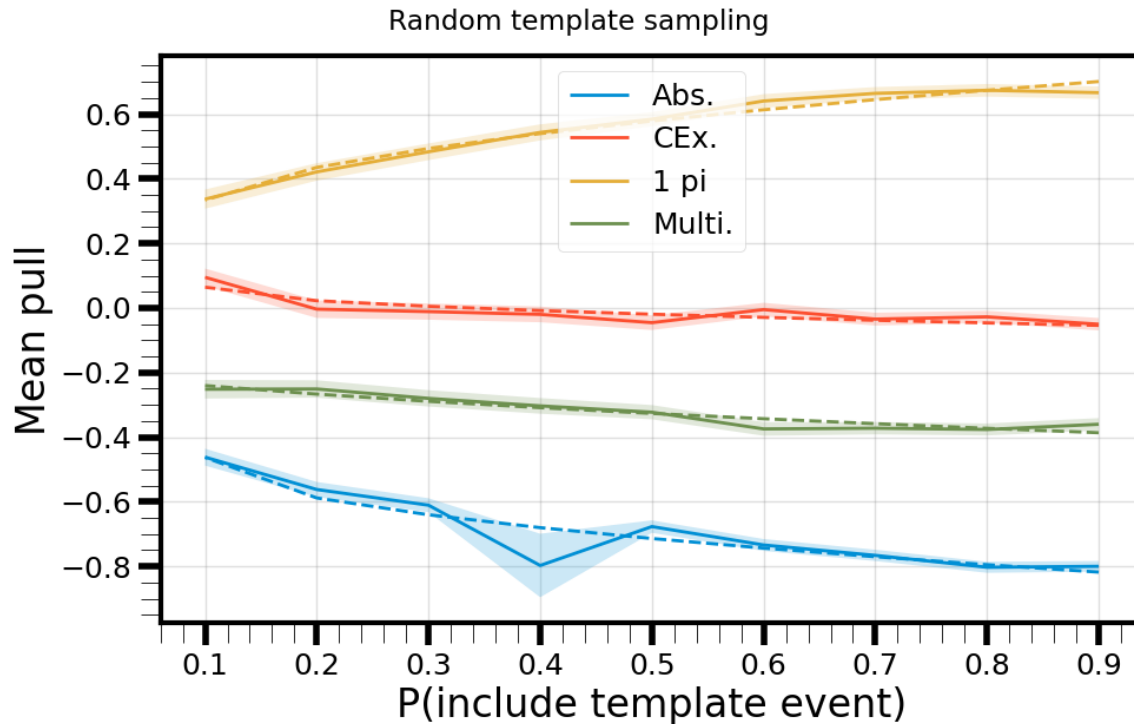
# Random fluctuation

- Same data draw
- Random change of drawing from template sample between 0.1 and 0.9
- Sometimes get failing fits. For now: identify and remove by checking if any predictions  $< 1$ .

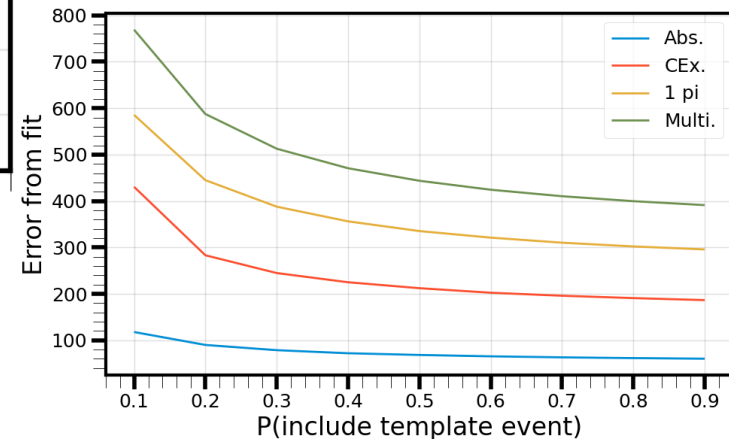


# Random fluctuation

- 1000 pulls each, template sample chance: [0.1, 0.9]

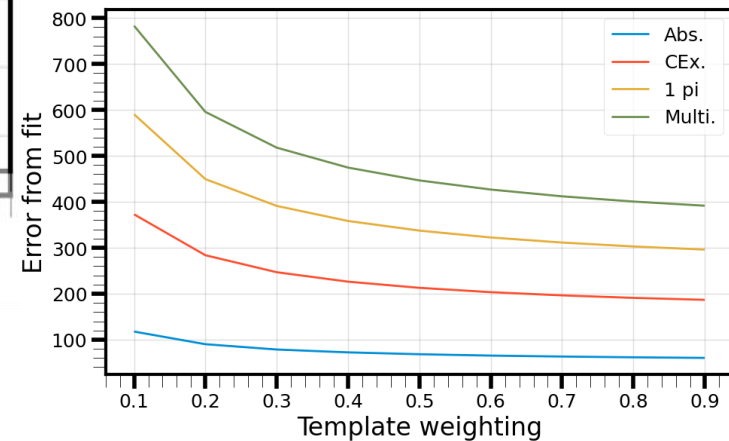
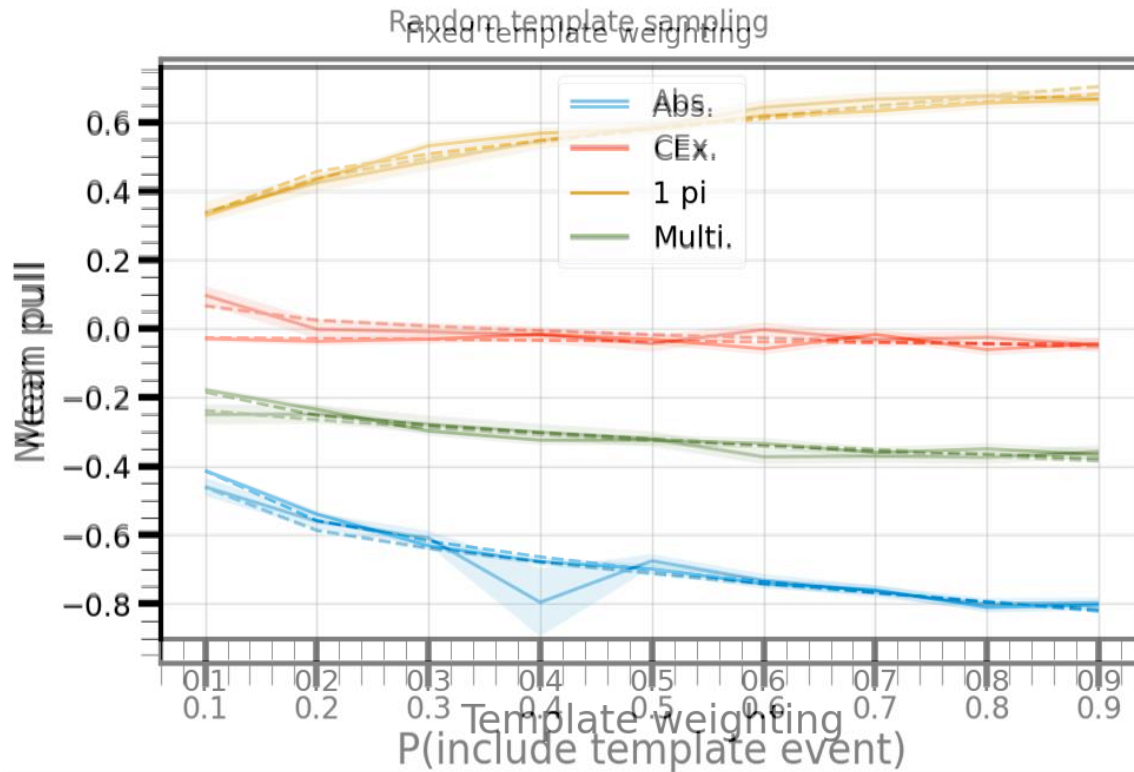


---- : fit to  $a\sqrt{x - b} + c$



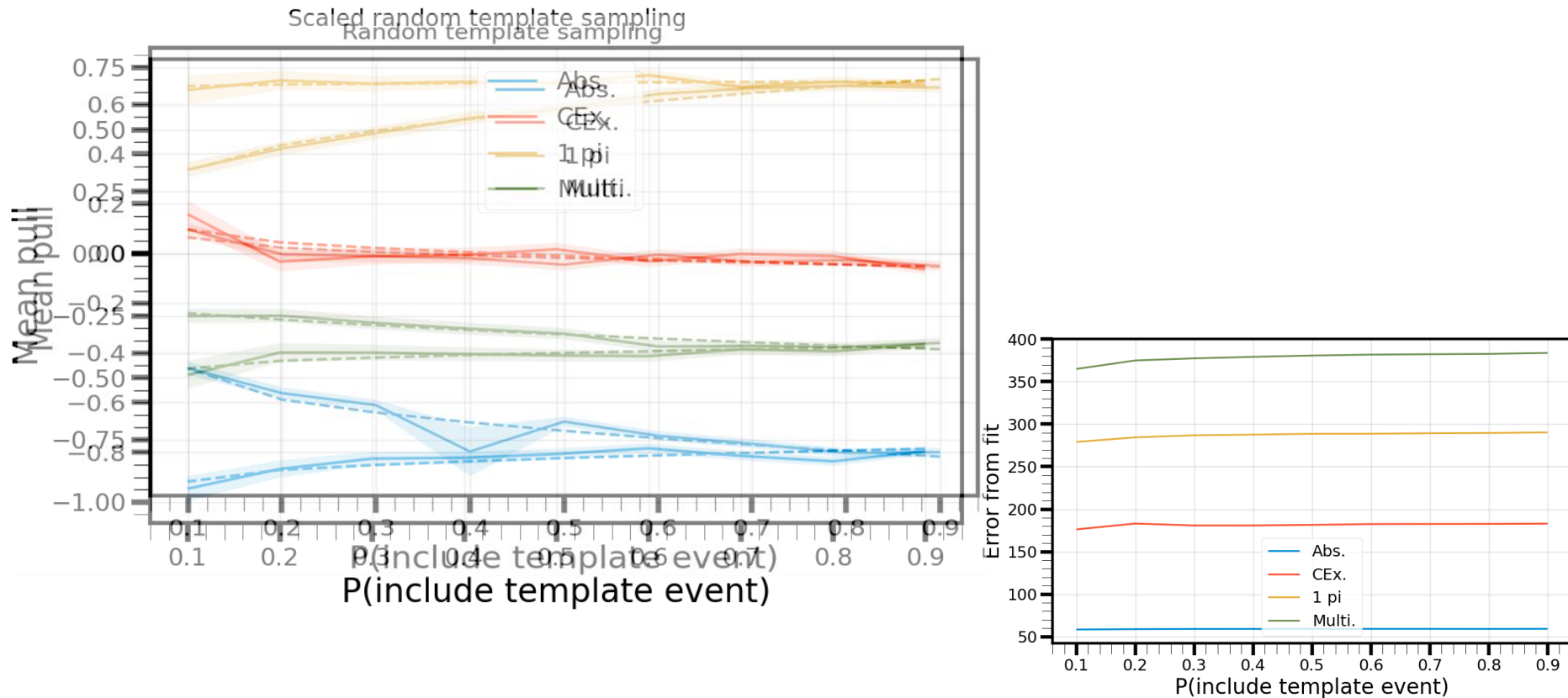
# Fixed weighting

- 1000 pulls each, template weightings [0.1, 0.9]



# Fluctuate with inverse weighting

- 1000 pulls each, template sample probs: [0.1, 0.9]
- Weightings [1/0.1, 1/0.9]



# Reduce signal count

- 1000 pulls each, data sample chances:
  - [0.5, 0.4, 0.3, 0.2, 0.1, 0.05, 0.02, 0.01]

