

Pandora vertexing paper plot updates

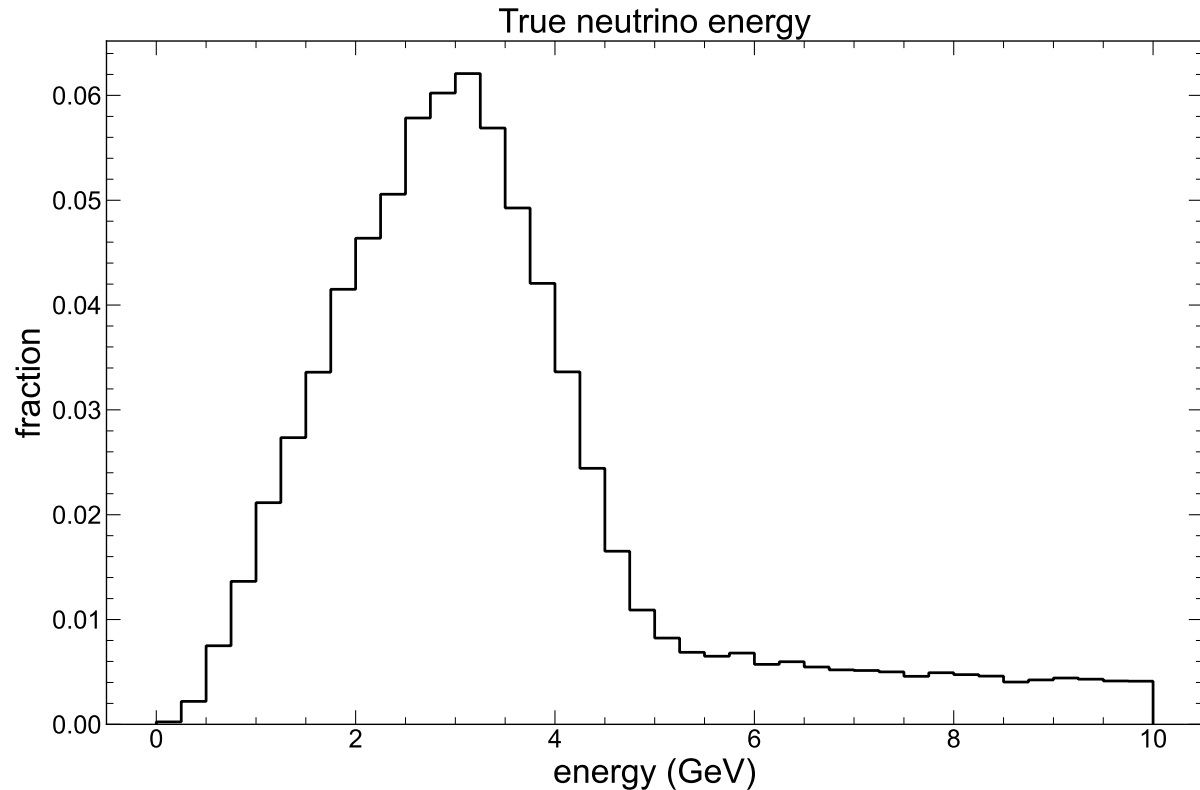
Andy Chappell

04/11/2024

FD Sim/Reco Meeting

- Currently in ARC review
- Responded to all comments
- Awaiting confirmation the reviewers are satisfied with those responses
- Presenting new plots and somewhat more heavily modified plots since the WG review for group sign off here
 - I am not including trivial modifications like line thickness, font size, etc

True neutrino energy

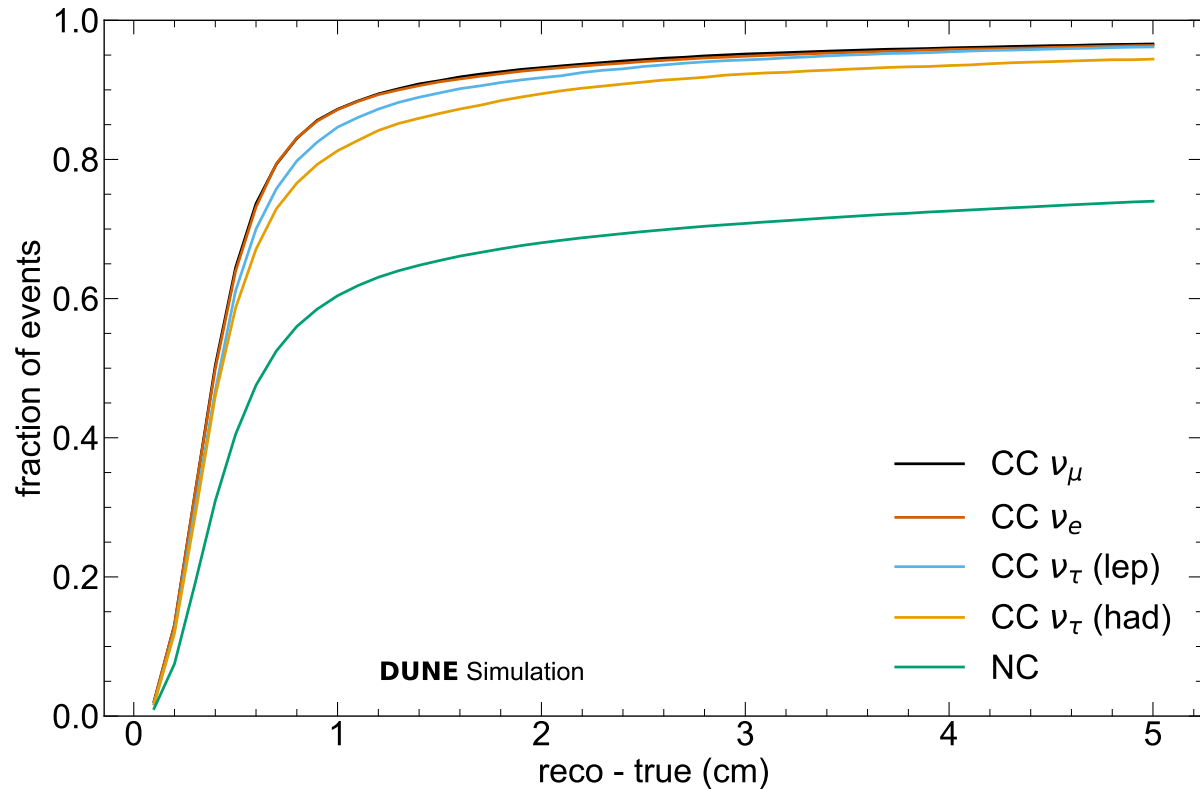


- Request for additional plot showing the true neutrino energy spectra for the samples

(will add overflow bin)

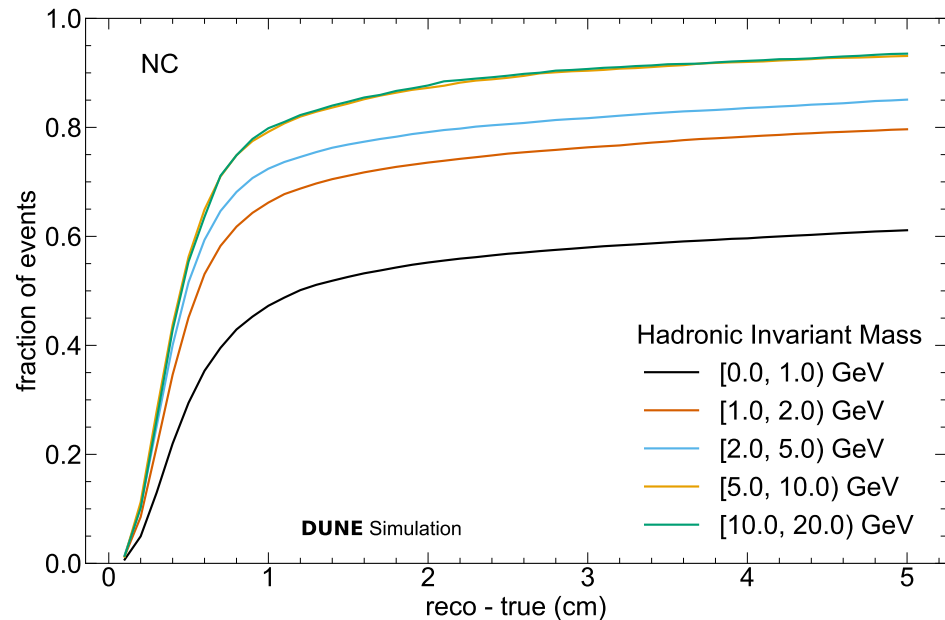
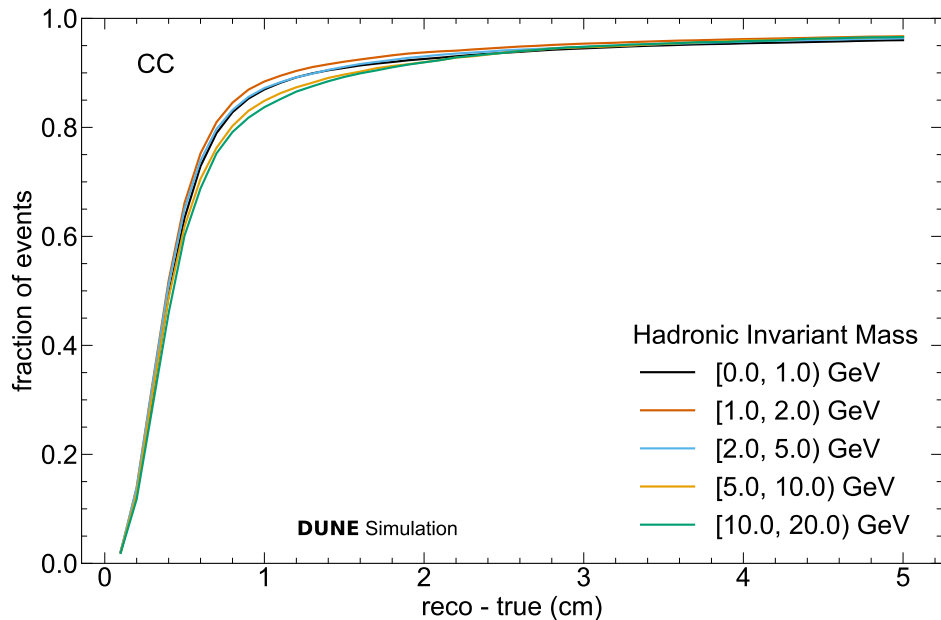
Fig 2: Distribution of true neutrino energy for the simulated samples up to 10 GeV

Performance by current, flavour and decay



- Received request to combine performance per flavour (+NC) into a single plot along with a further breakdown of performance based on the nature of tau decays

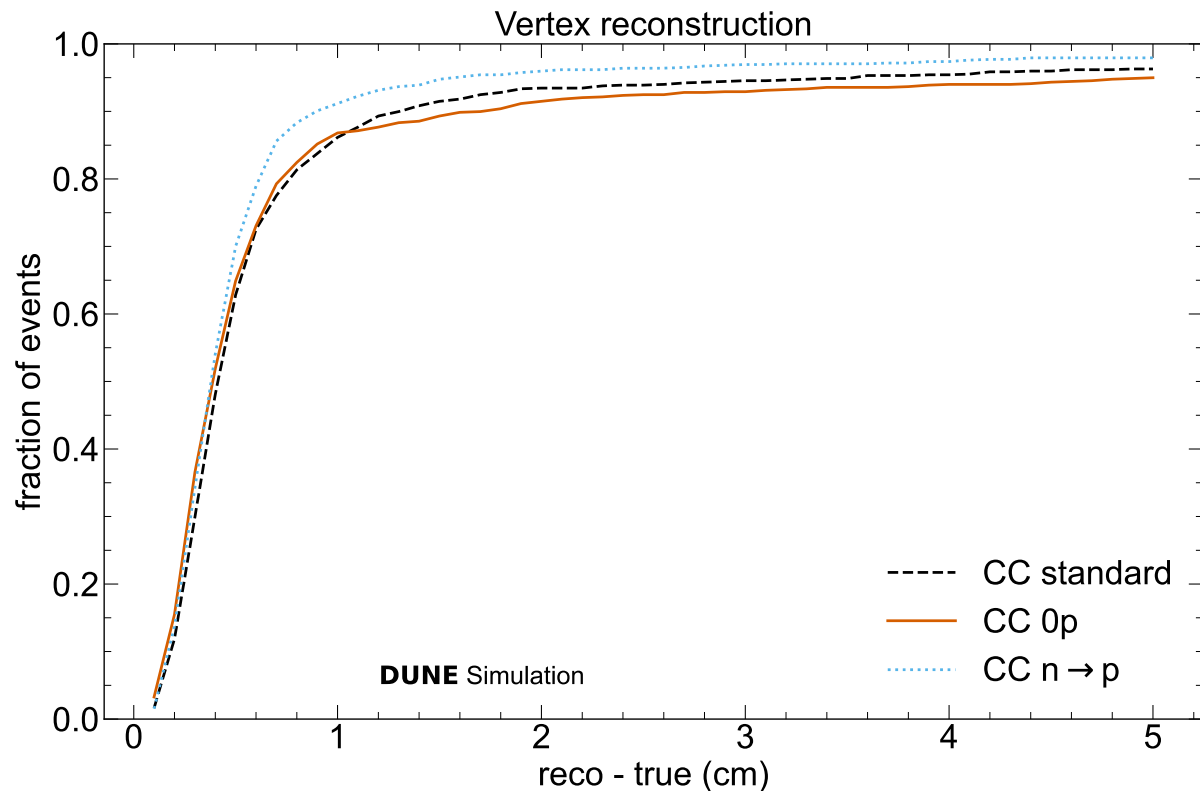
Fig 8: Fraction of vertices reconstructed within a given distance of the true neutrino interaction vertex ... (d) shows the performance of the new DL network for different currents, flavors and in the case of CC ν_τ interactions, for the leptonic and hadronic decays of the τ .



- Received request to add hadronic invariant mass alongside inelasticity plots

Fig 11: Fraction of vertices reconstructed within a given distance of the true neutrino interaction (all flavors) vertex as a function of ... hadronic invariant mass for (c) CC and (d) NC events. The CC interactions show little sensitivity to ... hadronic invariant mass, while NC interactions approach CC performance only at higher ... hadronic invariant mass.

Model dependency plots - CC



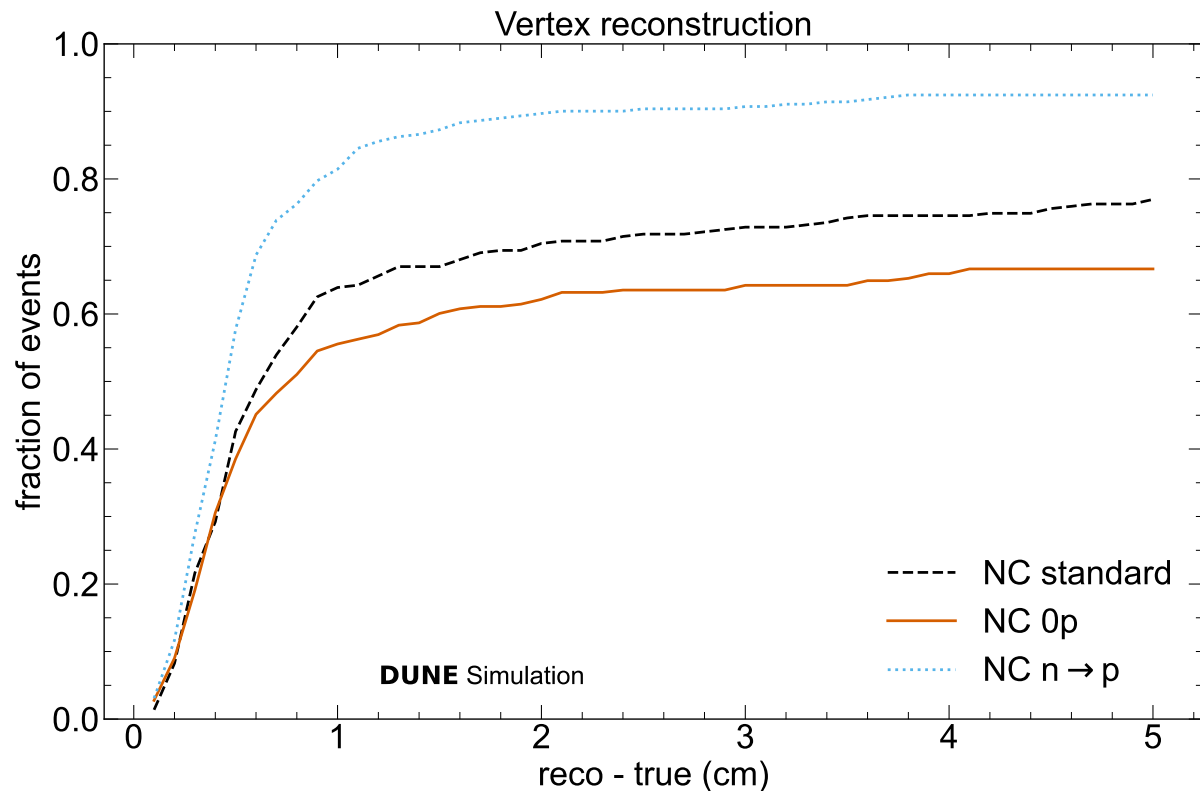
- Previously had pair-wise comparisons of the different “models”, request to combine them into one plot

0p refers to events where final state protons with momentum < 0.4 GeV are suppressed

n → p refers to events where final state neutrons are replaced by protons

Fig 14: Fraction of reconstructed vertices as a function of distance to the true vertex for the standard, n→p and 0p samples, split into (left) CC and (right) NC interactions.

Model dependency plots - NC



- Previously had pair-wise comparisons of the different “models”, request to combine them into one plot

0p refers to events where final state protons with momentum < 0.4 GeV are suppressed

n → p refers to events where final state neutrons are replaced by protons

Fig 14: Fraction of reconstructed vertices as a function of distance to the true vertex for the standard, n→p and 0p samples, split into (left) CC and (right) NC interactions.

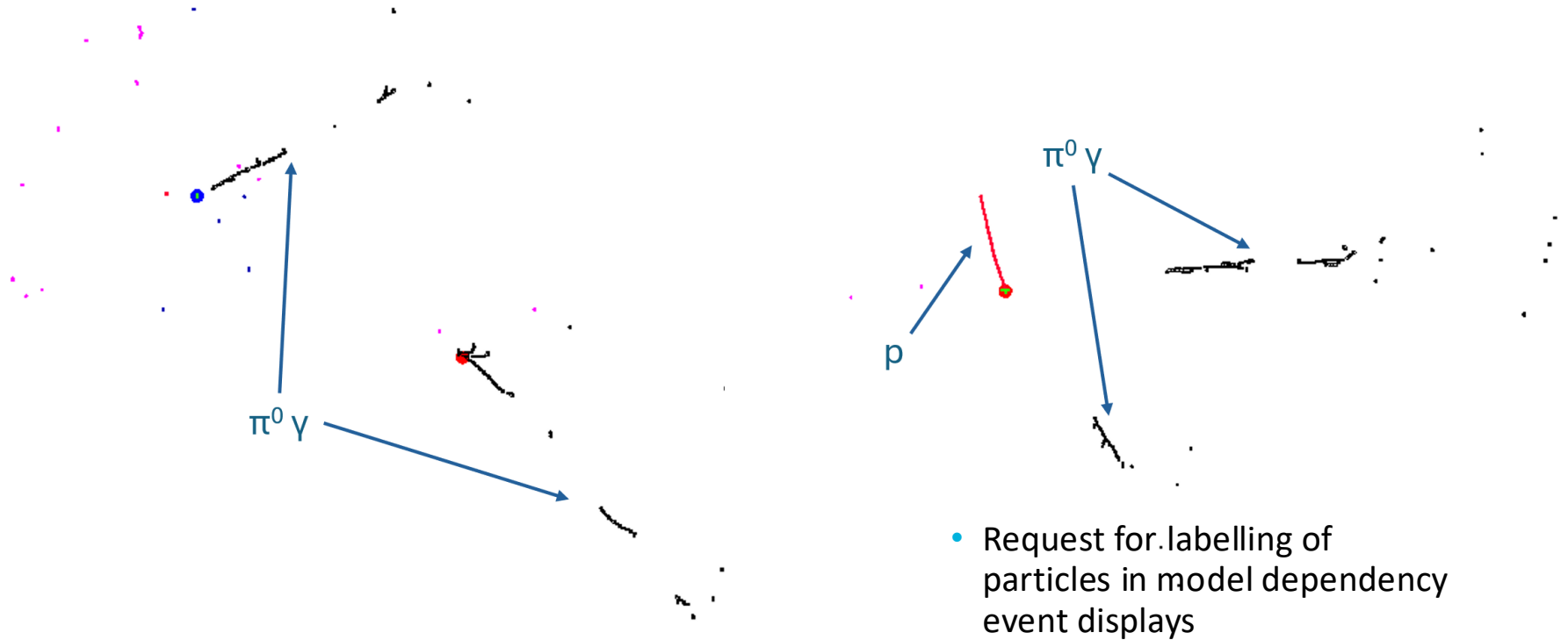


Fig 16: 2.8 GeV NC interaction with a π^0 and either (left) a neutron or (right) proton in the final state. The true interaction vertex is indicated by the blue circle, while the reconstructed interaction vertex is indicated by the red circle.

Model dependency EVDs

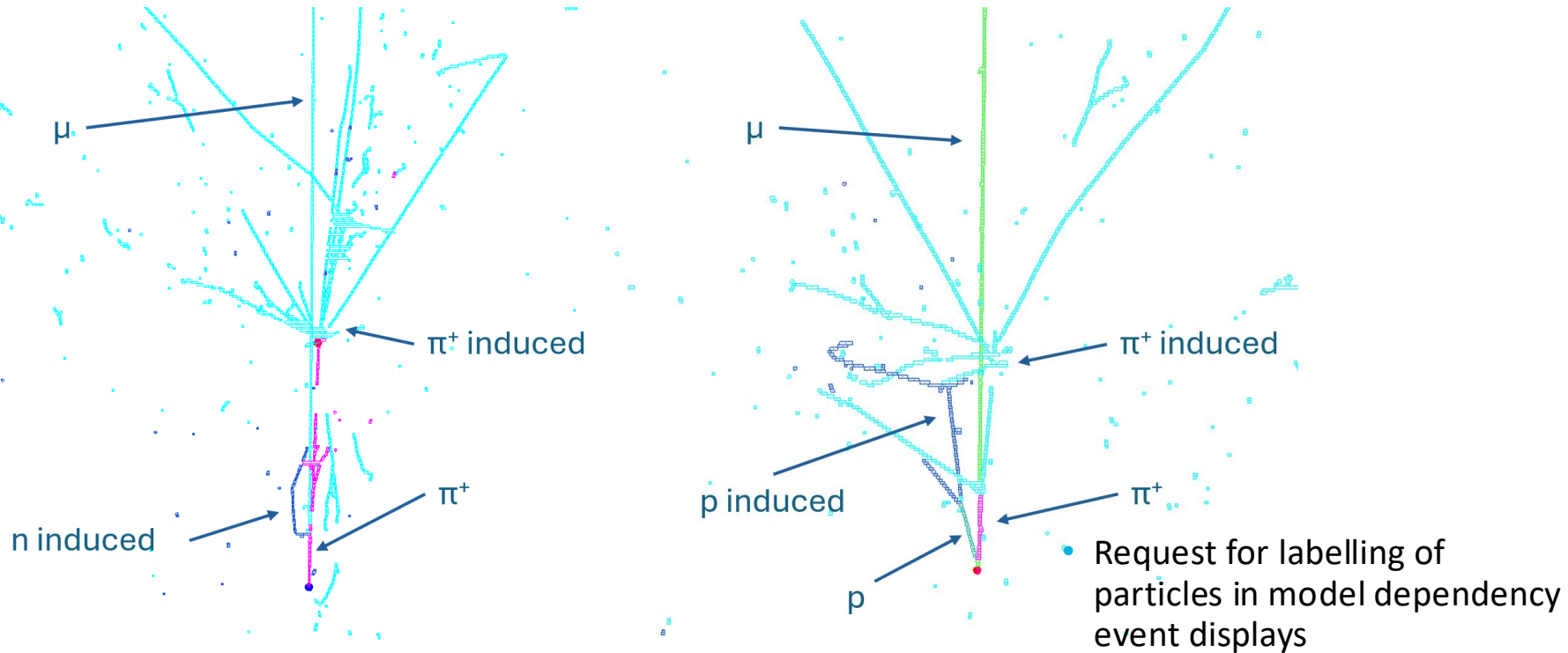


Fig 17: 24.9 GeV CC interaction with a μ , a π^+ and either (left) a neutron or (right) proton in the final state. The true interaction vertex is indicated by the blue circle, while the reconstructed interaction vertex is indicated by the red circle.

Model dependency EVDs

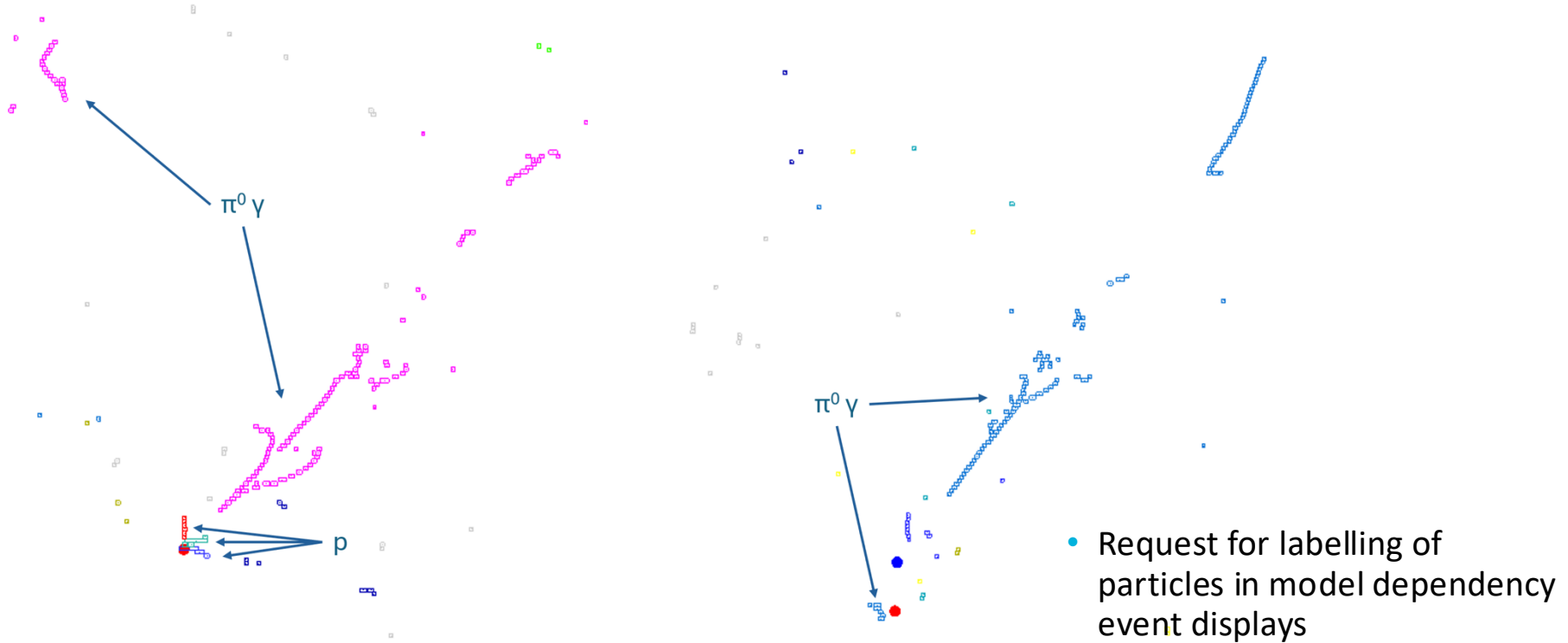


Fig 18: 1.6 GeV NC interaction with a π^0 , nine neutrons and either (left) three or (right) zero protons in the final state. The true interaction vertex is indicated by the blue circle, while the reconstructed interaction vertex is indicated by the red circle