Rough plan – PRISM framework

Network trained for “Selected Events” only

1. Start with NDSelected Events (FDErecPred)
2. Subtract ND Background (FDErecPred)
3. **Correct for ND Efficiency:** mock-up data-driven efficiency

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→ smearing matrix obtained for SelectedEvents (FDErecPred vs Etrue): Selected M_{ij}^{ND}
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– get the Generated ND Events Vs Etrue matrix by unfolding:

– normalize smearing matrix M_{ij}^{ND} to NDEfficiency(Etrue):

Generated M_i^{ND} (Etrue) = (M_{ij}^{ND})$^{-1}$ × Selected M_j^{ND} (FDErecPred)

– translate to **Generated ND Events Vs FDErecPred**

– smearing matrix normalized to "efficiency = 1: M_{ij}^{ND100}

Generated M_j^{ND} (FDErecPred) = M_{ij}^{ND100} × Generated M_i^{ND} (Etrue)

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Would be replaced by ND Geometric Efficiency Correction

– translate to **Generated ND Events Vs FDErecPred**

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– translate to **Generated ND Events Vs FDErecPred**

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Generated M_j^{ND} (FDErecPred) = M_{ij}^{ND100} × Generated M_i^{ND} (Etrue)

4. Correct for the FD efficiency (still some thought to be given but could in principle be done by applying the same FD-cvn selection cuts to the ND efficiency corrected events – either while or after making the state file)

→ FD efficiencies > 90 %

Rough plan – PRISM framework

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   → FD efficiencies > 90 %
5. Apply Off-Axis Coefficients

Rough plan – PRISM framework

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Would be replaced by ND Geometric Efficiency Correction

– translate to **Generated ND Events Vs FDErecPred**

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→ FD efficiencies > 90 %

5. Apply Off-Axis Coefficients

5.1 probably at this point we would want to add some

MCExtrap correction = (FDPrediction – FD Bckg) – (NDFDExtrapolated Linearly Combined)

Rough plan – PRISM framework

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Would be replaced by ND Geometric Efficiency Correction

– translate to **Generated ND Events Vs FDErecPred**

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5. Apply Off-Axis Coefficients

5.1 probably at this point we would want to add some

MCExtrap correction = (FDPrediction – FD Bckg) – (NDFDExtrapolated Linearly Combined)

6. Add FD Background + MCExtrap correction

→ **PRISMPrediction with NDFDExtrapolation**

Rough plan – PRISM framework: status right now

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1. Start with NDSelected Events (FDErecPred)
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3. **Correct for ND Efficiency:** mock-up data-driven efficiency

→ smearing matrix obtained for SelectedEvents (FDErecPred vs Etrue): Selected $M_{ij}^{ND,}$ (i = 1, nEtrue ; j = 1, nFDErecPred)

– get the Generated ND Events Vs Etrue matrix by unfolding:

– normalize smearing matrix M_{ij}^{ND} to NDEfficiency(Etrue):

Generated M_i^{ND} (Etrue) = (M_{ij}^{ND})$^{-1}$ × Selected M_j^{ND} (FDErecPred)

– translate to **Generated ND Events Vs FDErecPred**

– smearing matrix normalized to "efficiency = 1: M_{ij}^{ND100}

Generated M_j^{ND} (FDErecPred) = M_{ij}^{ND100} × Generated M_i^{ND} (Etrue)

⟶ **Implemented those in the code and played a bit with it, quite weird results so far.. (didn't really have much time to cross check everything)**

Correct for ND Effiency

Network trained for "Selected Events" only

1. Start with NDSelected Events (FDErecPred)
2. Subtract ND Background (FDErecPred)

→ **NDSelectedEventsCC (FDErecPred)** = NDSelectedEvents (FDErecPred) - ND Background (FDErecPred)

ND Selected EventsCC (FDErecPred)

$(M^{ND}_{ij})^{-1}$ (FDErecPred Vs Etrue) – normalized to ND efficiency (Etrue)

Unfolding:

$(M_{ij}^{ND})^{-1}$ × ND SelectedEventsCC (FDErecPred)

ND Generated Events (ETrue)

M^{ND100}_{ij}(FDErecPred Vs Etrue) – normalized to 1 (100% efficiency)

Forward Folding:

M_{ij}^{ND100} × ND Generated (Etrue)

ND Generated Events (FDErecPred)

x FDEfficiency (=100%)

FD Selected Events (FDErecPred)

Apply coefficients

Correct for ND Efficiency + FD Efficiency standard

Network trained for "Selected Events" only

1. Start with NDSelected Events (NDErec)
2. Subtract ND Background (NDErec)

→ **NDSelectedEventsCC(Erec)** =
NDSelectedEvents (NDErec) - ND Background (NDErec)

ND Selected EventsCC (NDErec)

$(M^{ND}_{ij})^{-1}$ (Erec Vs Etrue)
– normalized to ND efficiency (Etrue)

Unfolding:
$(M_{ij}^{ND})^{-1}$ × ND SelectedEventsCC (NDErec)

ND Generated Events (ETrue)

M^{FD}_{ij} (FDErec Vs Etrue)
normalized to FD efficiency (Etrue)

Forward Folding:
M^{FD}_{ij} × ND Generated (Etrue)

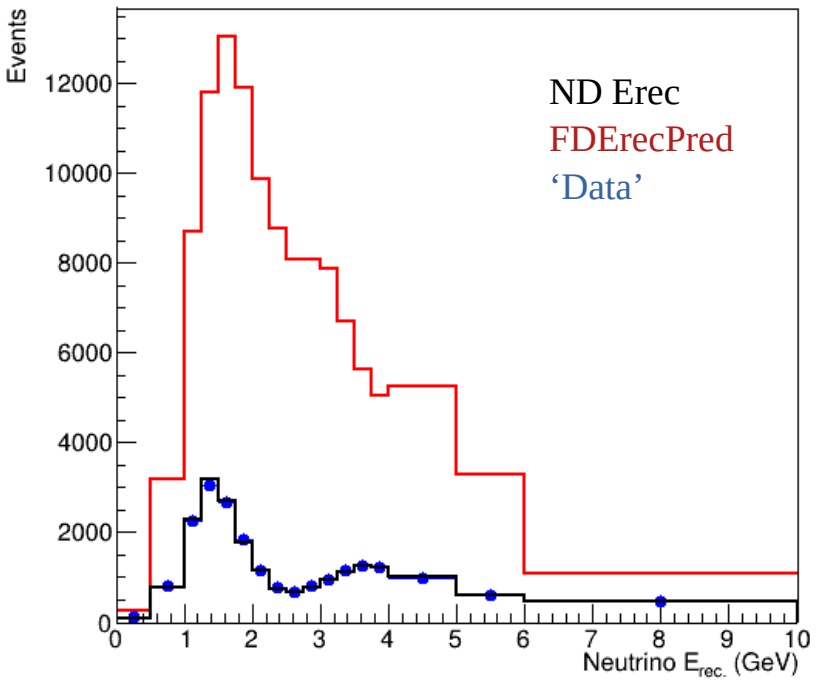
FD Selected Events (FDErec)

Apply coefficients

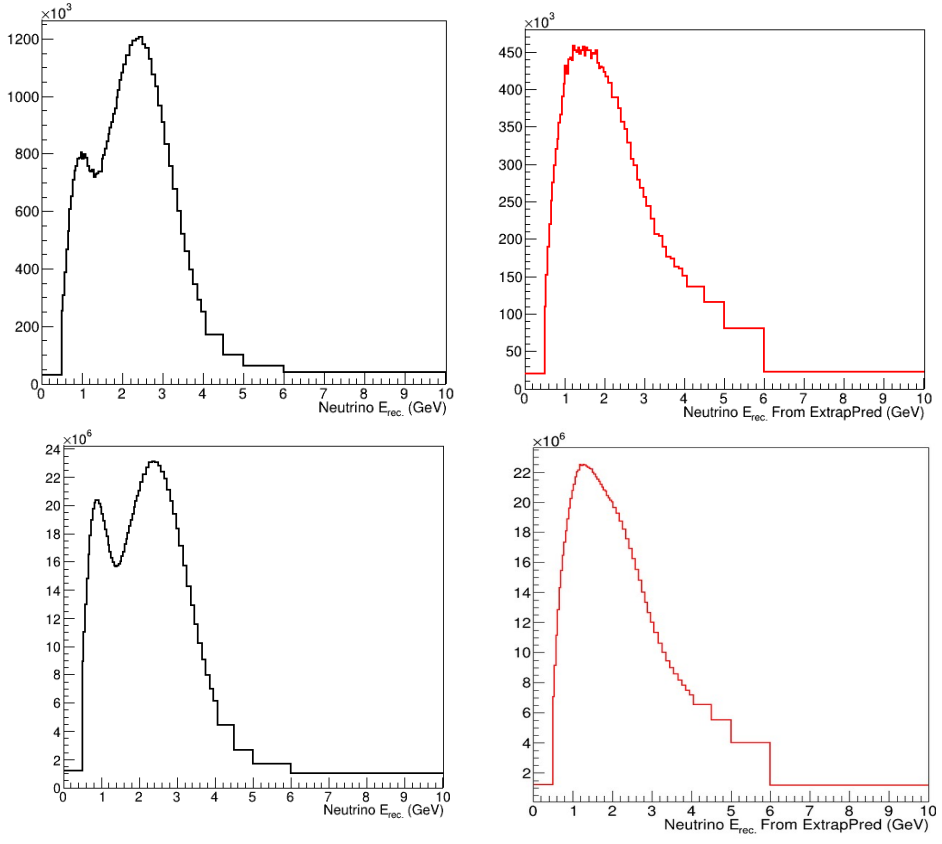
PRISM Analysis with FDErecPred

- Same PRISM analysis as before but working with FDErecPred does not produce good results… → why?

Final PRISM Prediction



ND Selected Events

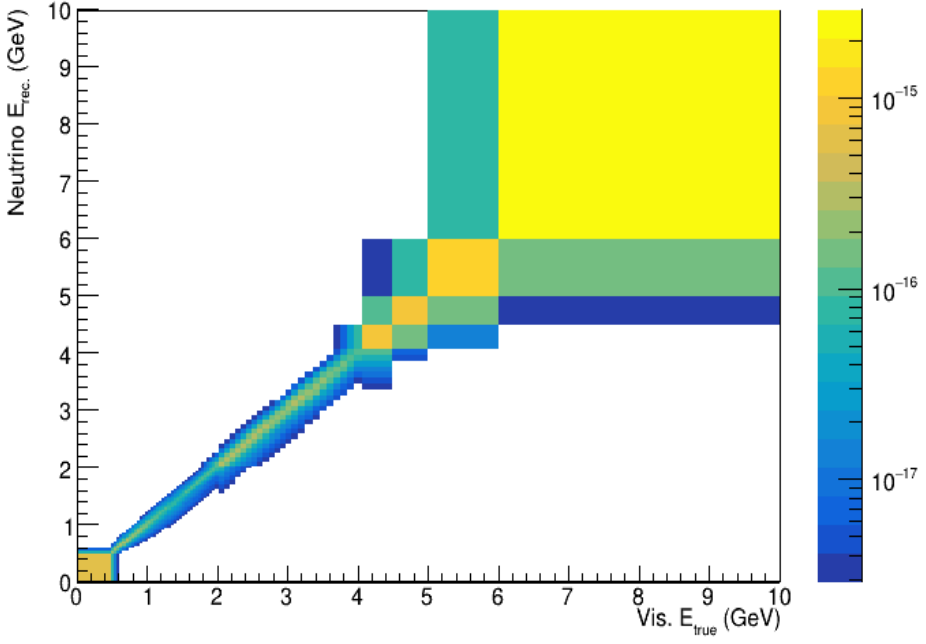


→ can't see the effect of the containment cut..why?

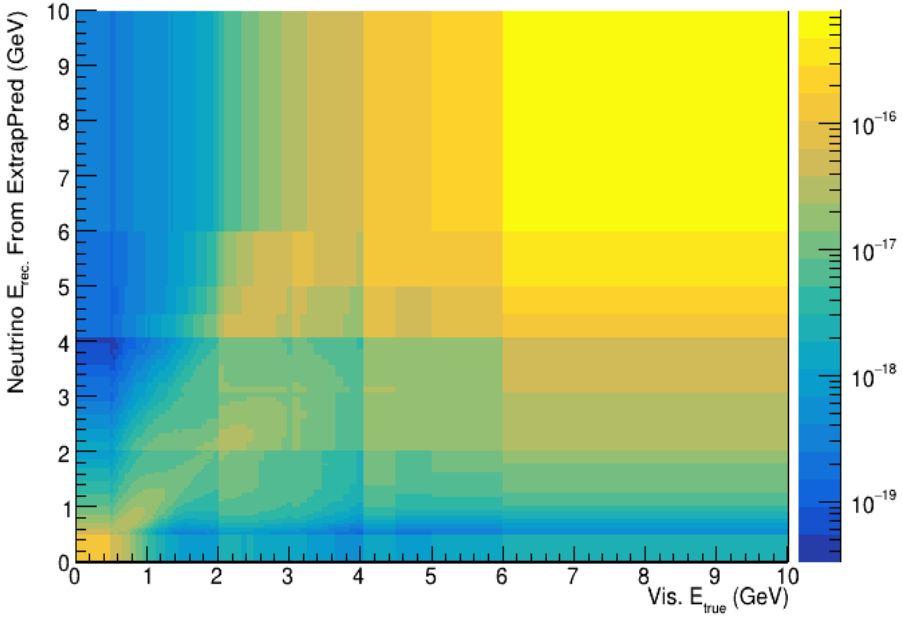
PRISM Analysis with FDErecPred

- Same PRISM analysis as before but working with FDErecPred does not produce good results… → why?

Smearing matrix from state file



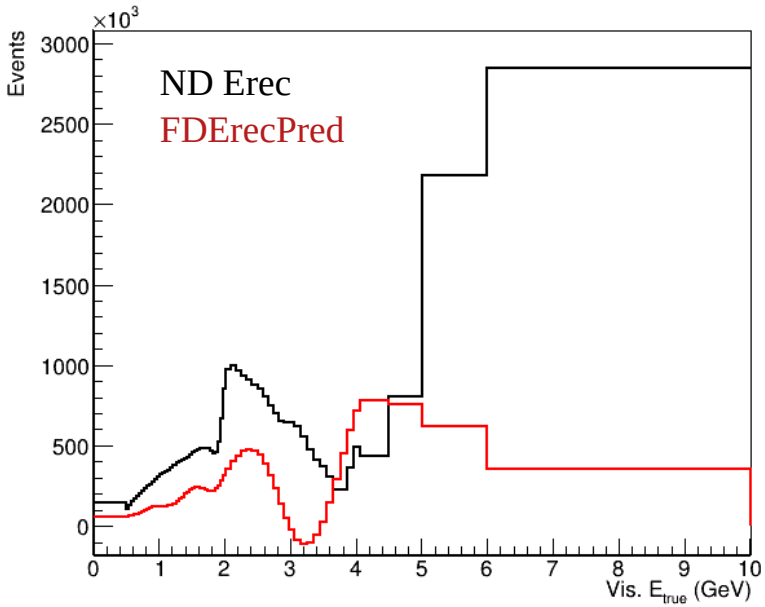
Smearing matrix from state file



PRISM Analysis with FDErecPred

- Same PRISM analysis as before but working with FDErecPred does not produce good results… → why?

ND Generated Events (Etrue)



ND Generated Events (Erec)