Extrapolation Cross-Check

Xiaobo Huang
ANL
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Files Used and Cuts

• Near data:
near_data_L010185N_cedar_phy_bhcurv_SUN_mcnn

• Near MC:
near_daikon00_L010185N_cedar_phy_SUN_mcnn

• Far MC:
far_beam_daikon00_L010185N_cedar_phy_SUN_mcnn
far_nue_daikon00_L010185N_cedar_phy_SUN_mcnn
far_tau_daikon00_L010185N_cedar_phy_SUN_mcnn

- SKZP and default oscillation parameter in far detector
- SKZP in near detector
- HOO and MRCC
- ANN11 > 0.7 or MCNN > 0.83 in the plots

Files used and Cuts (conti.)

HOO file:

minos/scratch/pawloski/Nue/HornOn_HornOff/HornOn/macros/MultiCuts/HornOnOff_15PercentBnue_SPECTRA_SYST_ann0.70_mcnn0.83.root

MRCC file:
/minos/scratch/annah1/SPECTRANEW/SPECTRA_GAMMA_ann070_mcnn083.root

Josh's inputs:
/minos/scratch/boehm/Extrapolation/20081020/Extrap1020/StandardSys/SysHelperFile_*

- my code with SKZP & Oscillation for a test far detector MC file yields exactly the same results w.r.t. Josh's code.

Selected Far/Near MC Events

(ANN2PE>0.7)

near detector

	NC	numu_CC	nue_CC	nuTau_CC	Beam Nue_CC
Josh	4429	1742			593.1
Xiaobo	4429	1742.2			593.1

far detector

	NC	numu_CC	nue_CC	nuTau_CC	Beam Nue_CC
Josh	25.6	5.24			2.23
Xiaobo	25.6	5.2			2.2

Near detector normalized to 1e19 POT
Far detector normalized to 3.25e20 POT

Selected Far/Near MC Events

(MCNN>0.8)

near detector

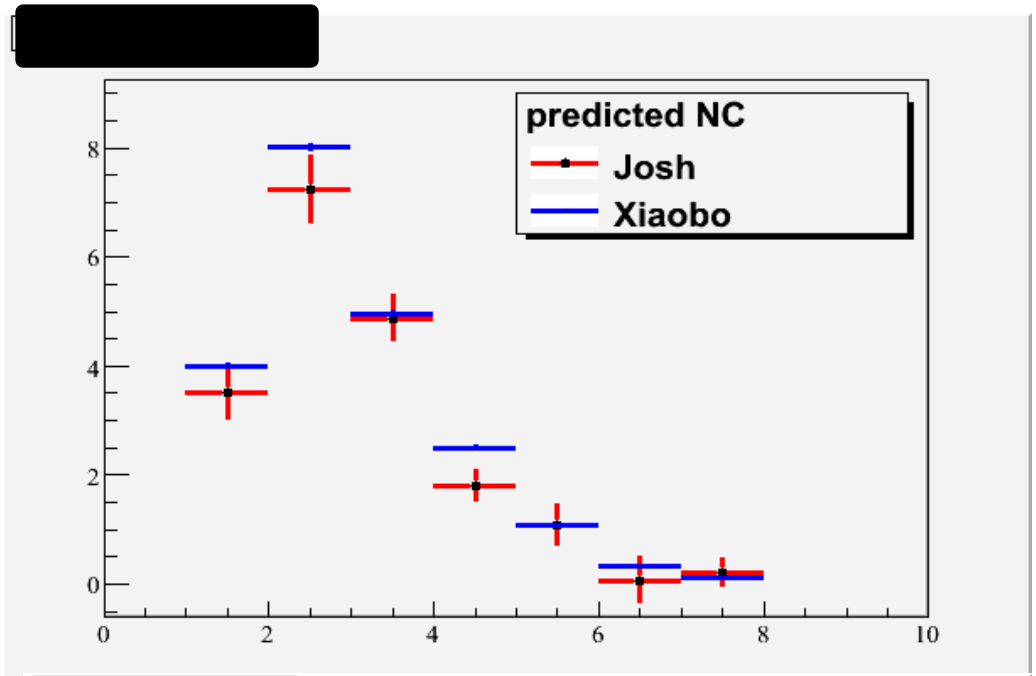
	NC	numu_CC	nue_CC	nuTau_CC	Beam Nue_CC
Josh	2519.8	1088.7			464
Xiaobo	2521.4	1091.1			464.4

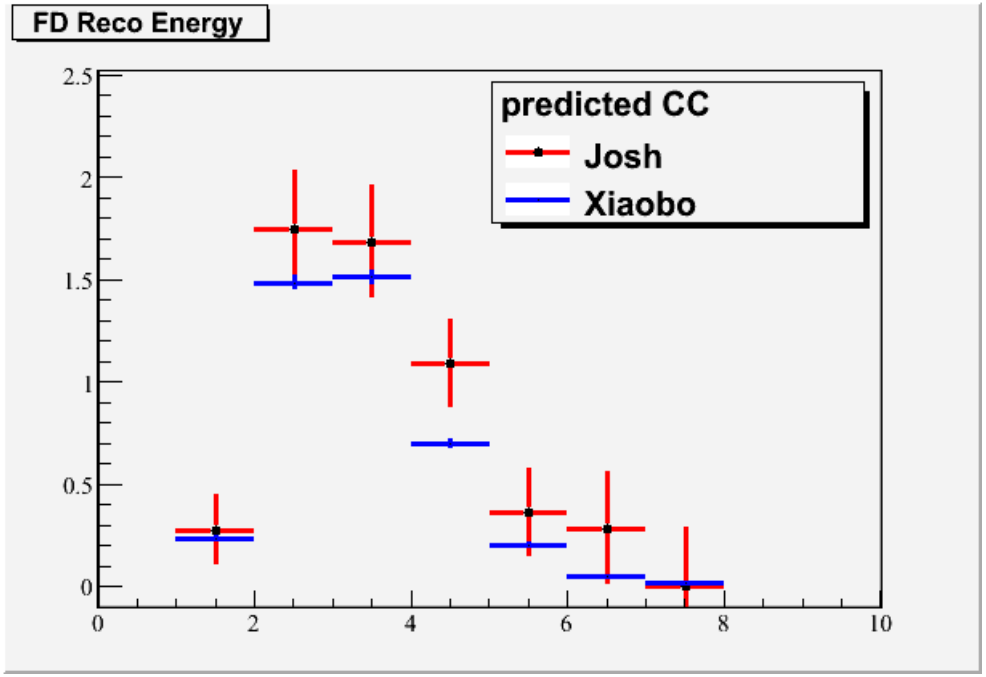
far detector

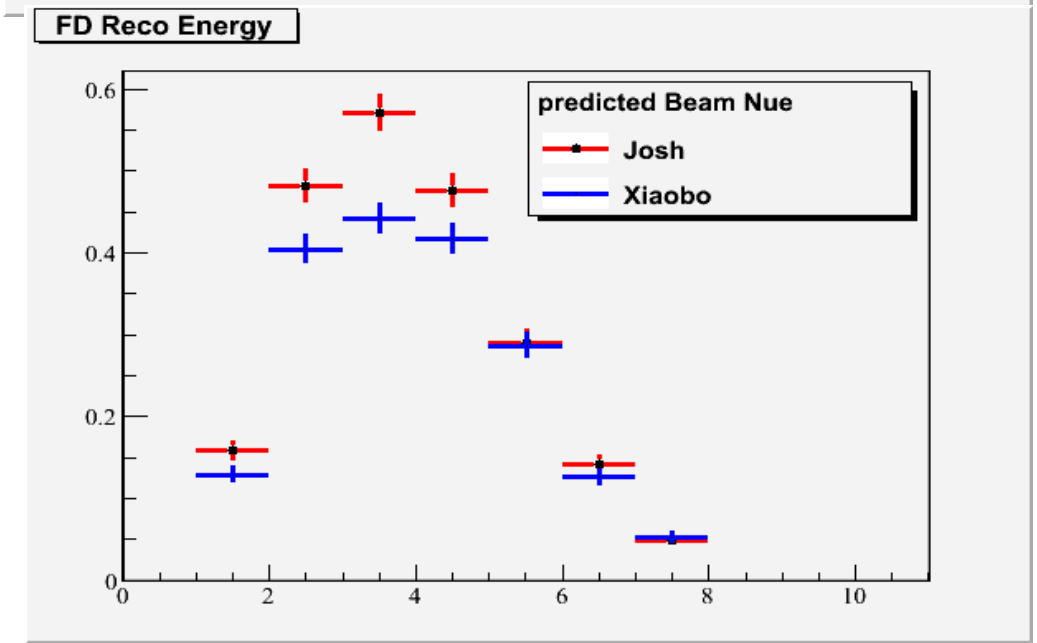
	NC	numu_CC	nue_CC	nuTau_CC	Beam Nue_CC
Josh	16.5	3.81			2.23
Xiaobo	16.6	3.8			2.2

Near detector normalized to 1e19 POT
Far detector normalized to 3.25e20 POT

Far Predictions (ANN & HOO)

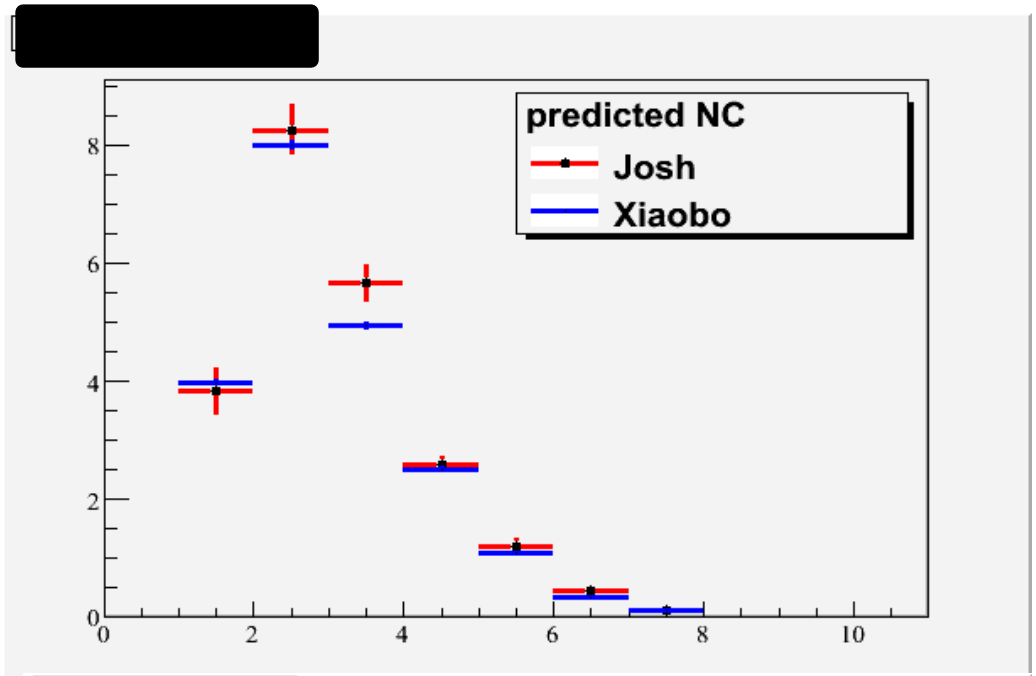


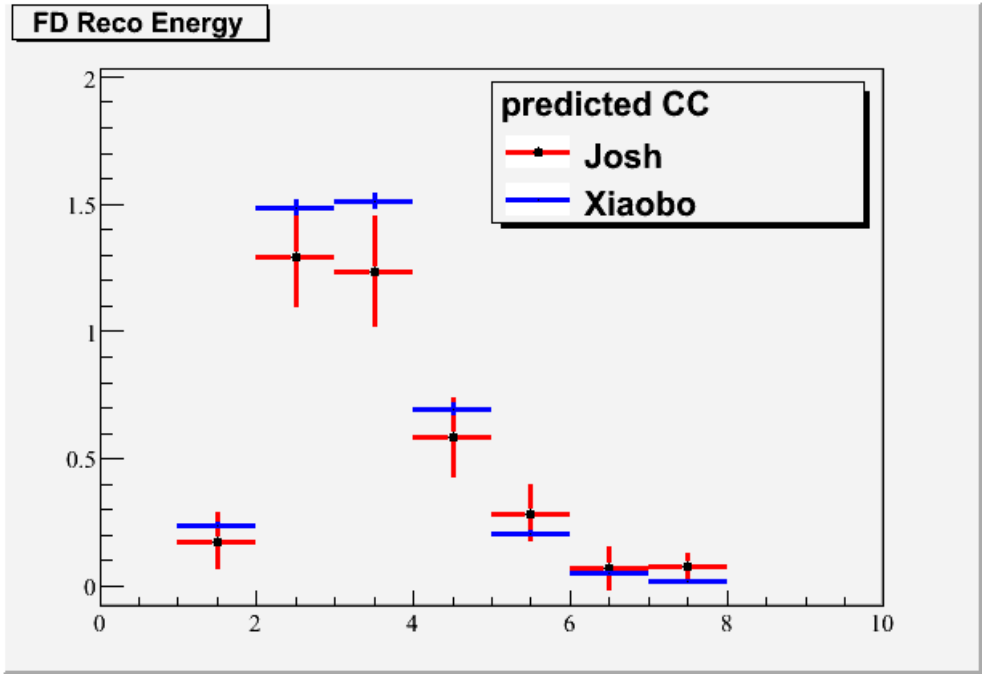


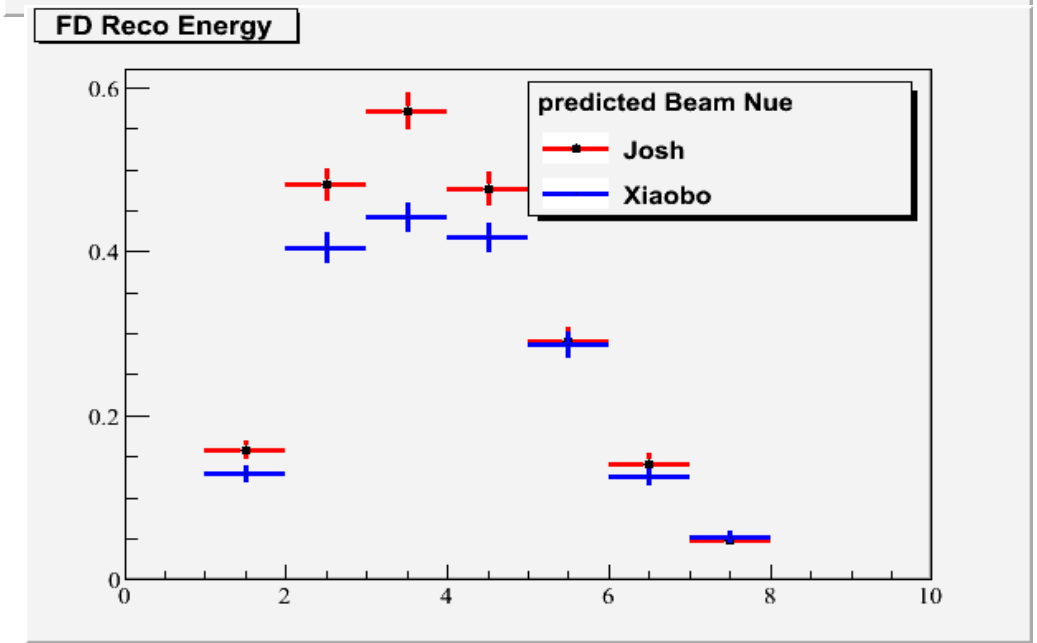


Selected near data (ANN11): 25172

Far Predictions (ANN & MRCC)





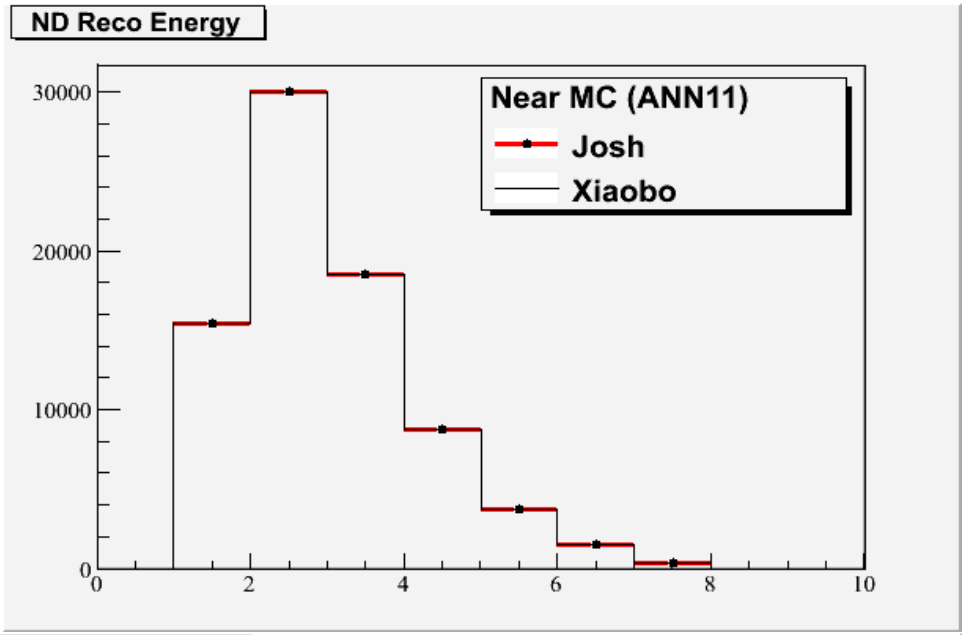


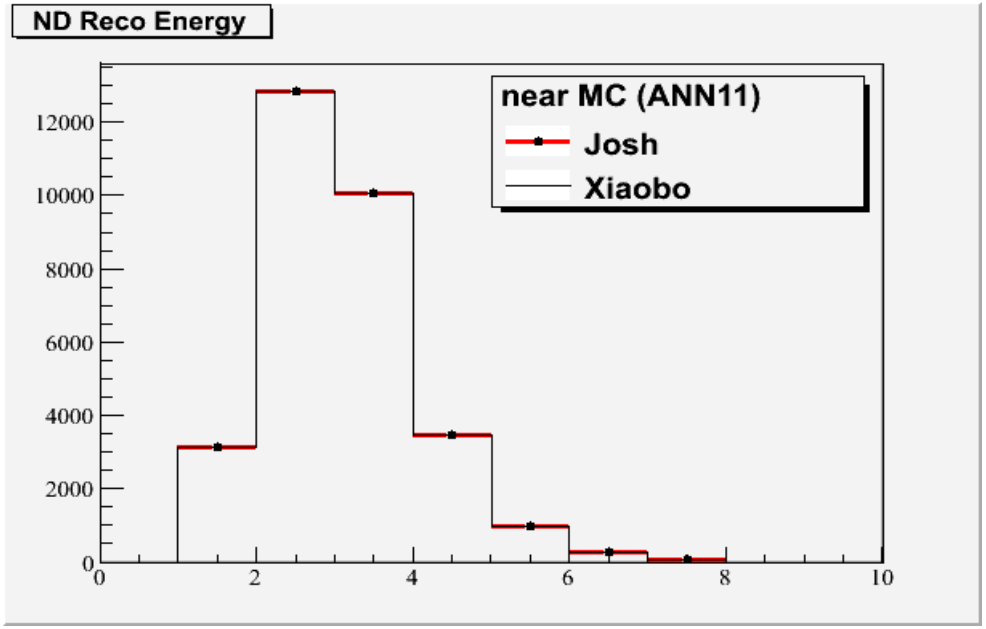
Selected near data (MRCC): 25172

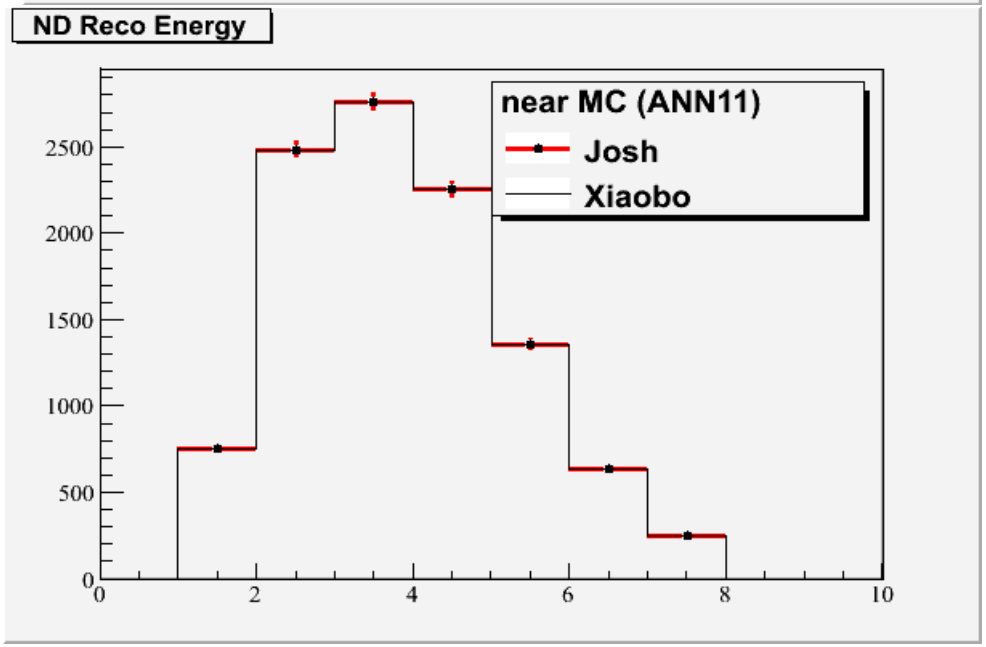
What causes this difference?

- To understand the difference in the prediction, a bin by bin (from 0 to 8 GeV) of the input information is performed.
- Only the ANN11 PID will be shown here.

Comparison by bins (near MC)

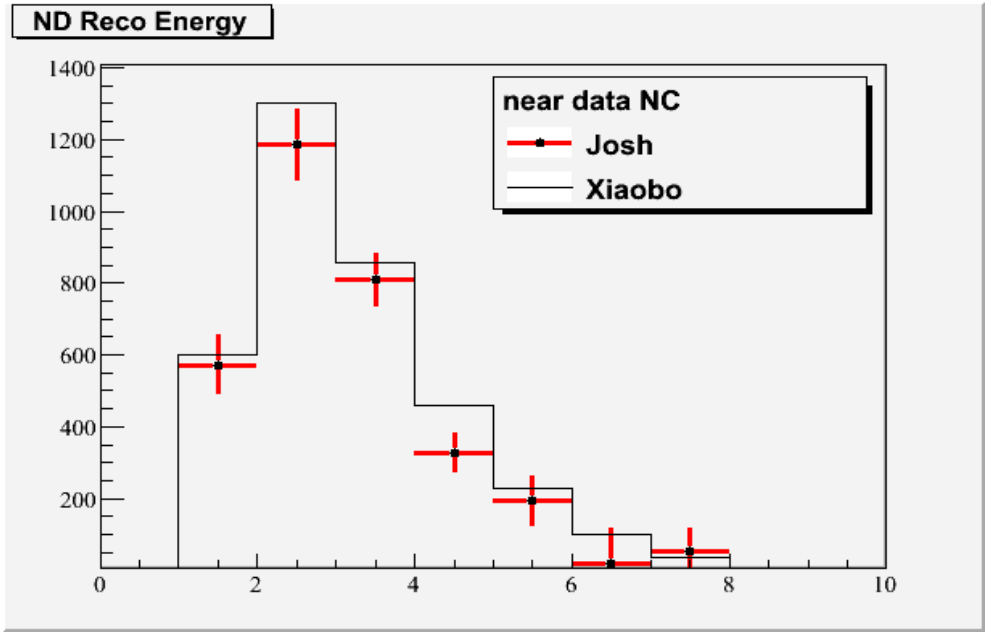


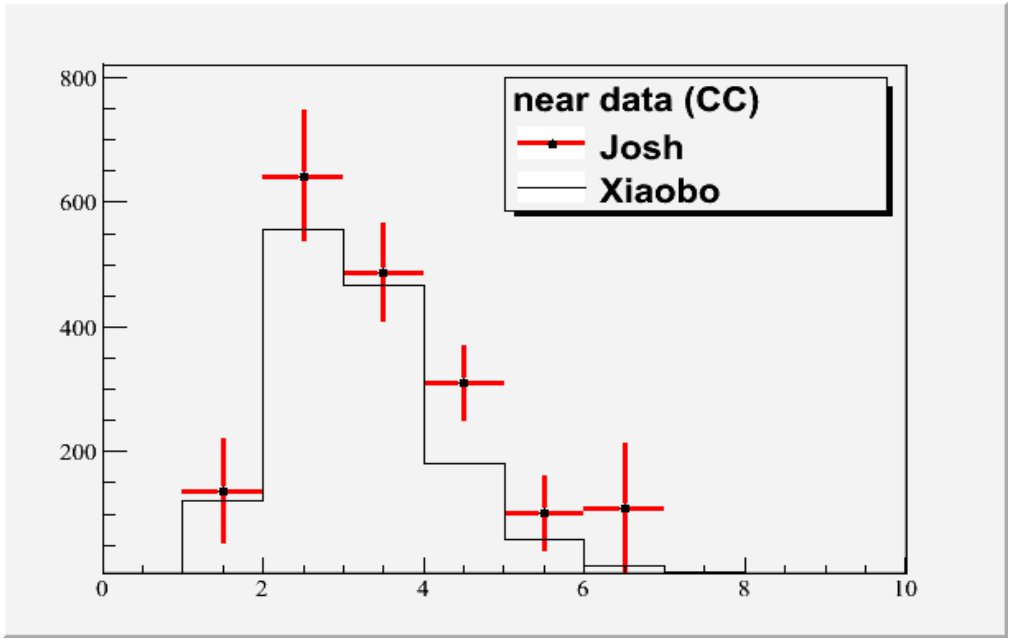


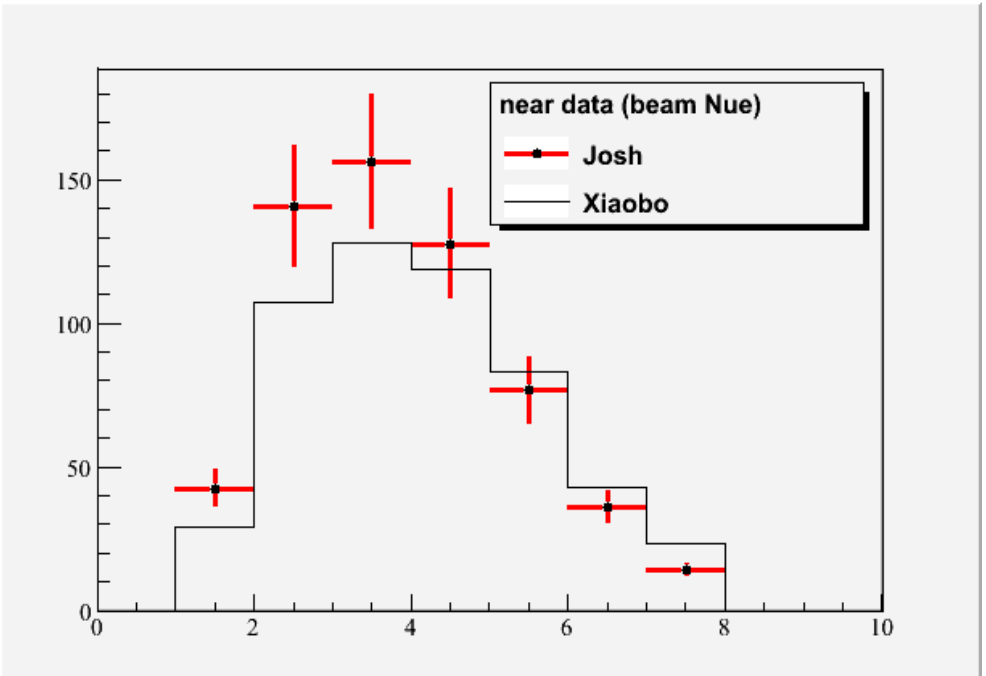


ANN11 for example here.
The near MC data agree.

Comparison by bins (near data)

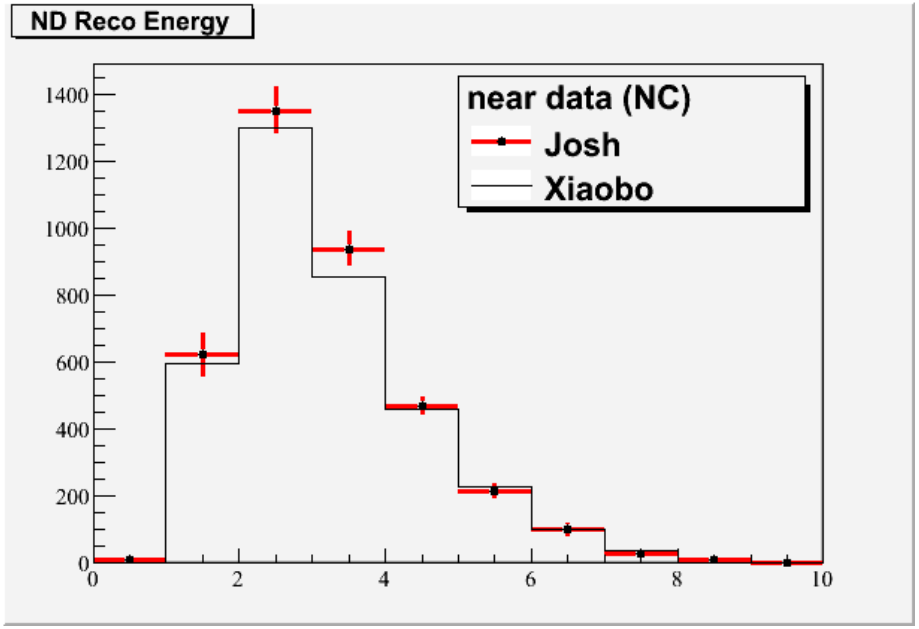


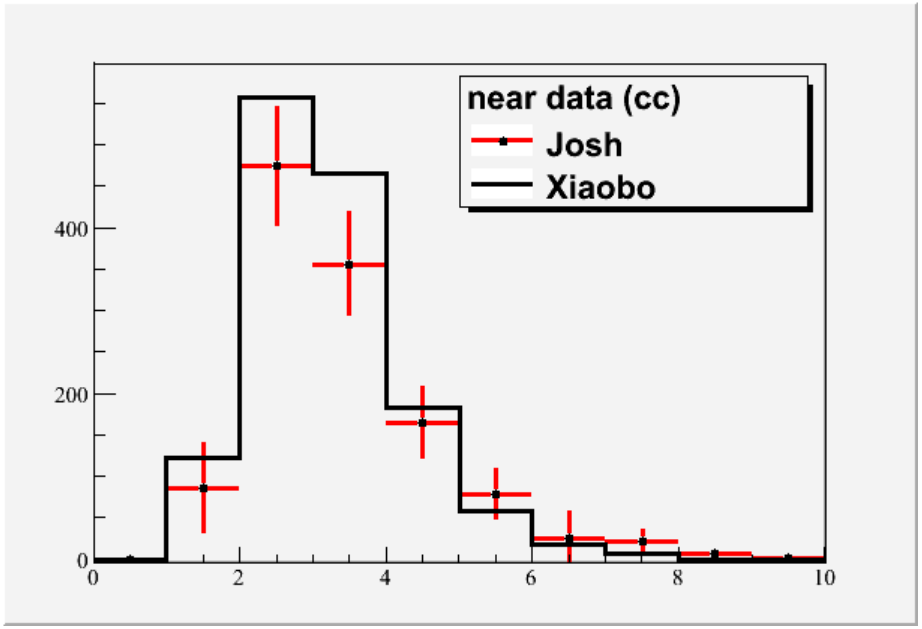


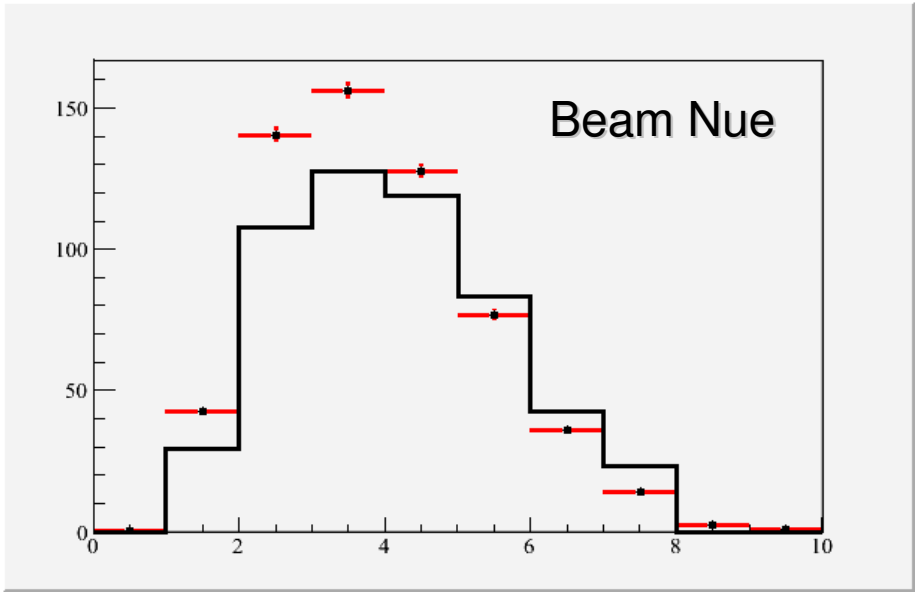


ANN11 & HOO
This difference is understood to be comparison, for example,
HOO vs. (near data)*(NC in HOO/ All in HOO).

Comparison by bins (near data)

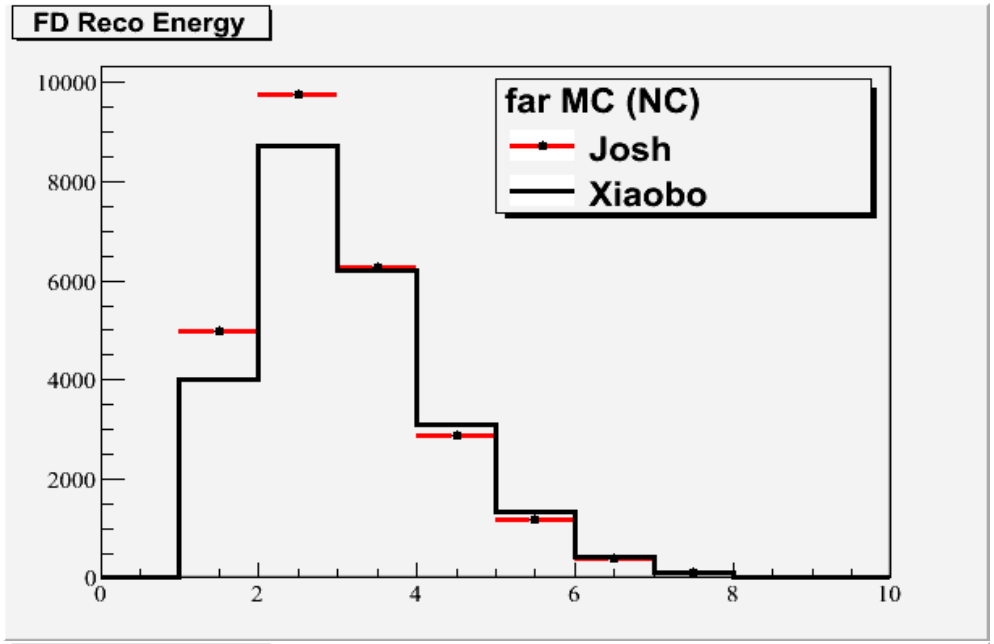


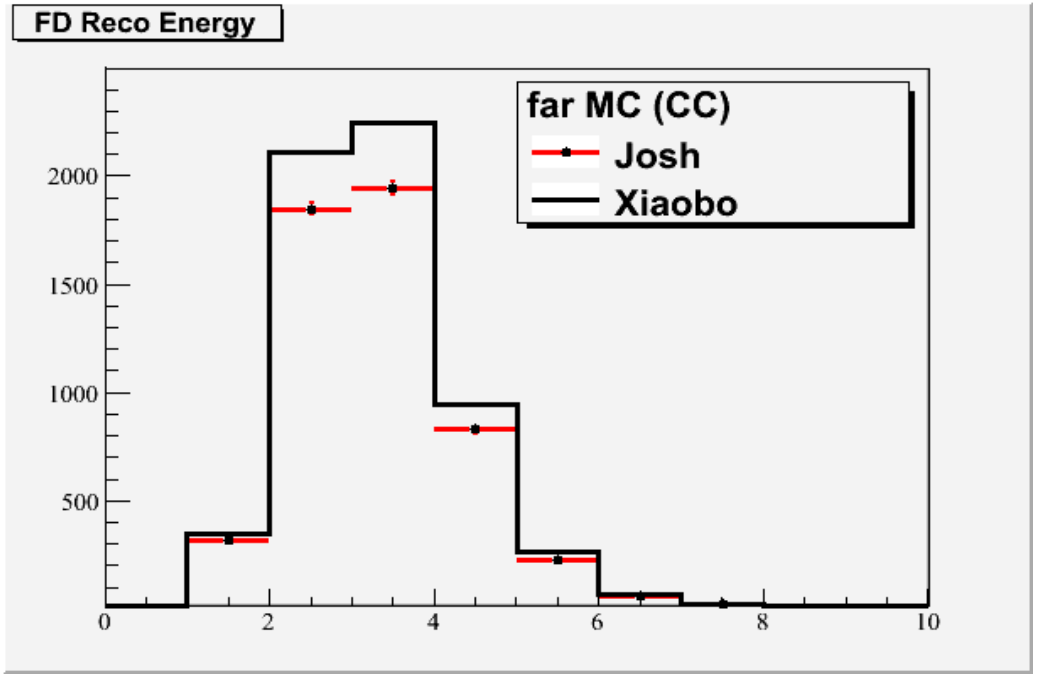


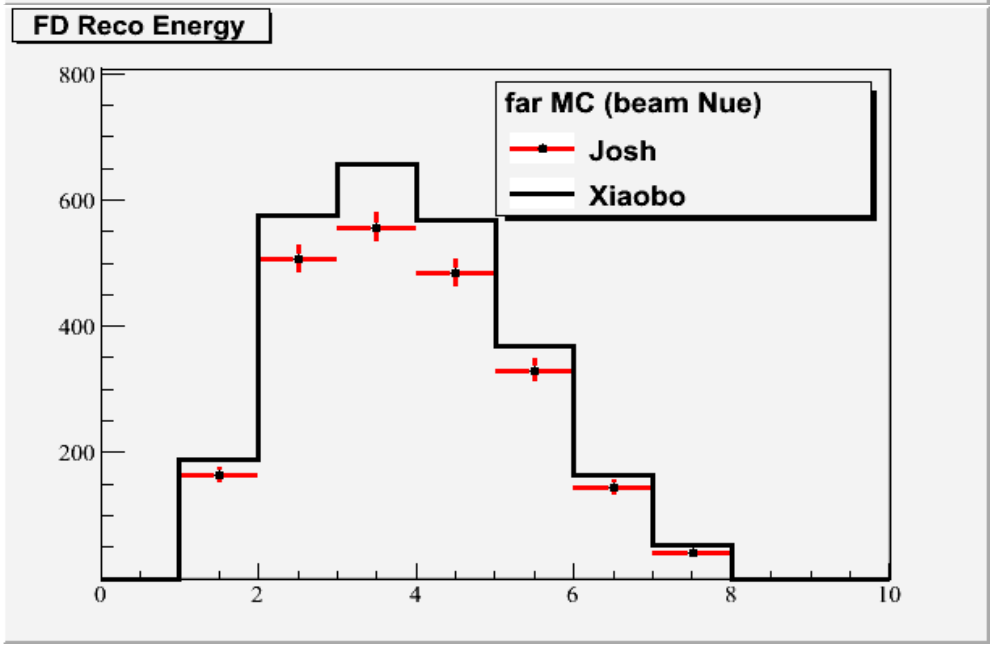


ANN11 & MRCC
This difference is understood to be comparison, for example, MRCC vs. (near data)*(NC in MRCC/ All in MRCC).

Comparison by bins (far MC)







Far detector ANN11
Normalized to 3.25e23 POT

Discussion

Bin by bin comparison:

- Near data: same HOO and MRCC but used in different ways
- Near MC: agree
- Far MC: some difference, but my code and Josh's code have the same response to a test far MC data file.

- Now, the source of the difference is determined to be a difference in the selected far MC events.