LUKE PICKERING

2017-10-02

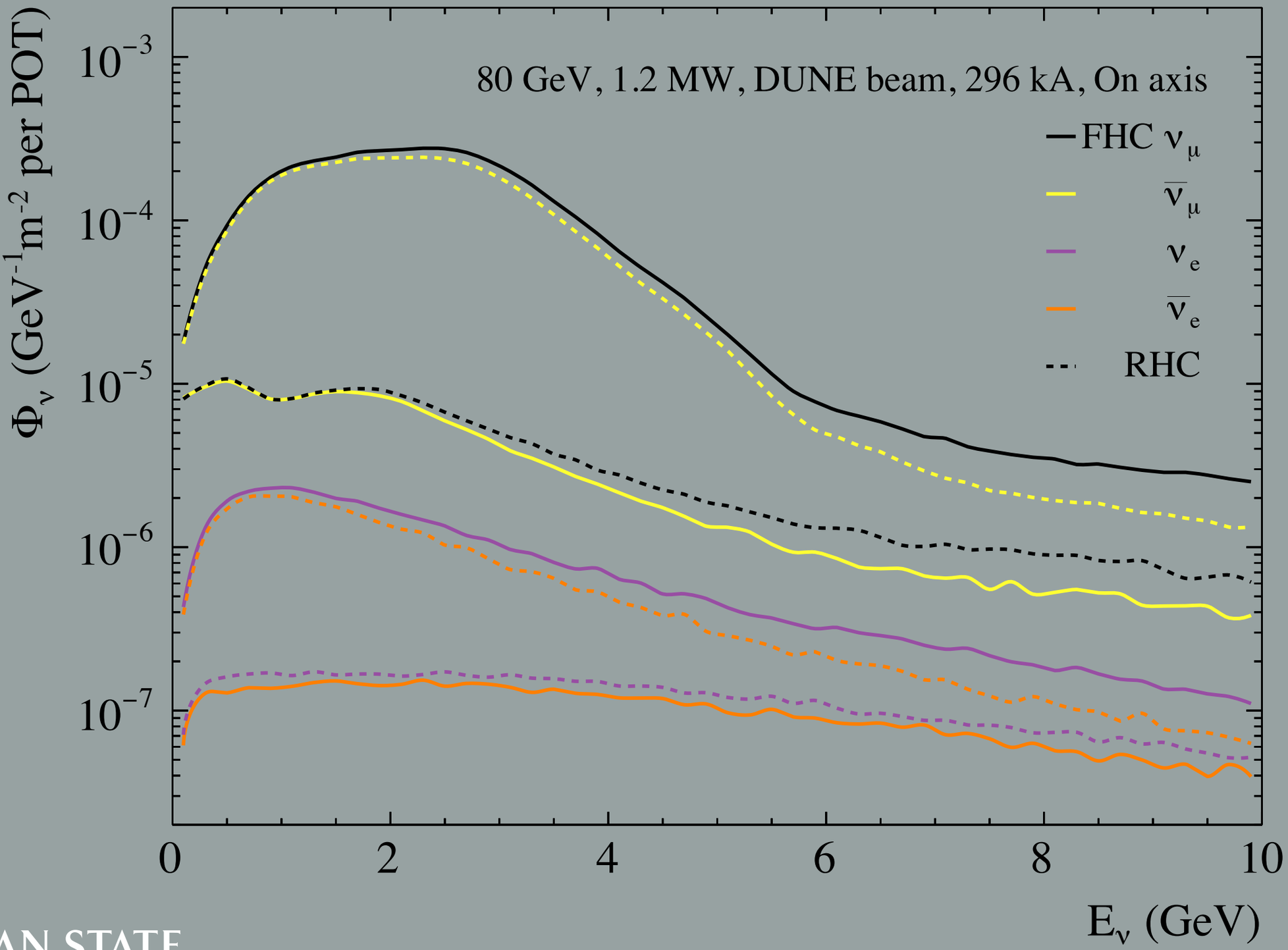
FLUX AND EVENT RATE PREDICTION UPDATE

MICHIGAN STATE
UNIVERSITY

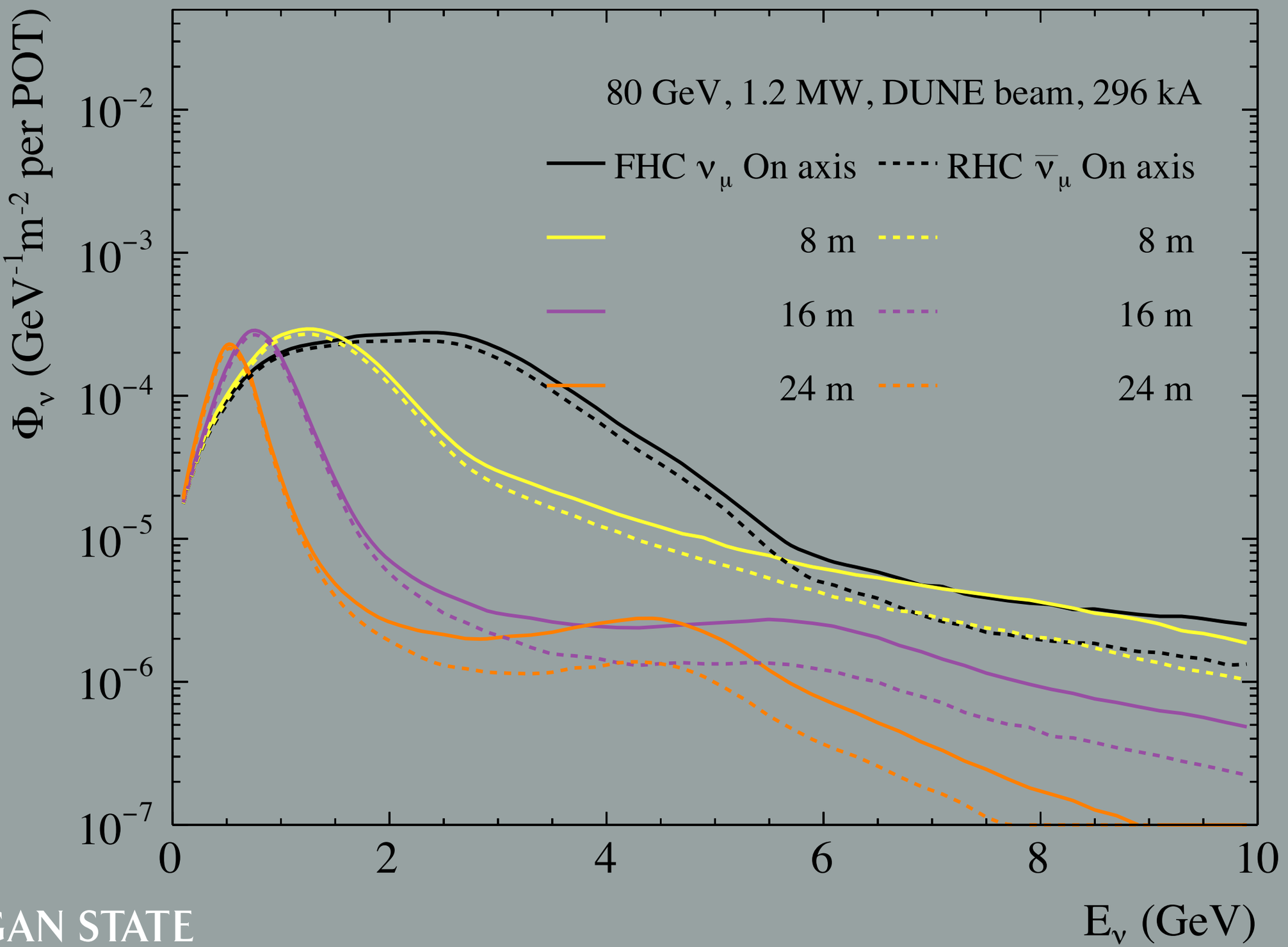
FLUX PREDICTIONS

- I updated my code to work with the latest beam line simulation format: dk2nu.
- Now have high stats flux predictions for some configuration — I believe the NDTF one: 80 GeV proton beam, 296 kA current (not sure about horn geometry).
- Laura checked and agreed that all the normalisations look sensible.
- Need to build the g4lbne code and send off some grid jobs with tweaked parameters. I will hopefully find time to get on with that this week.

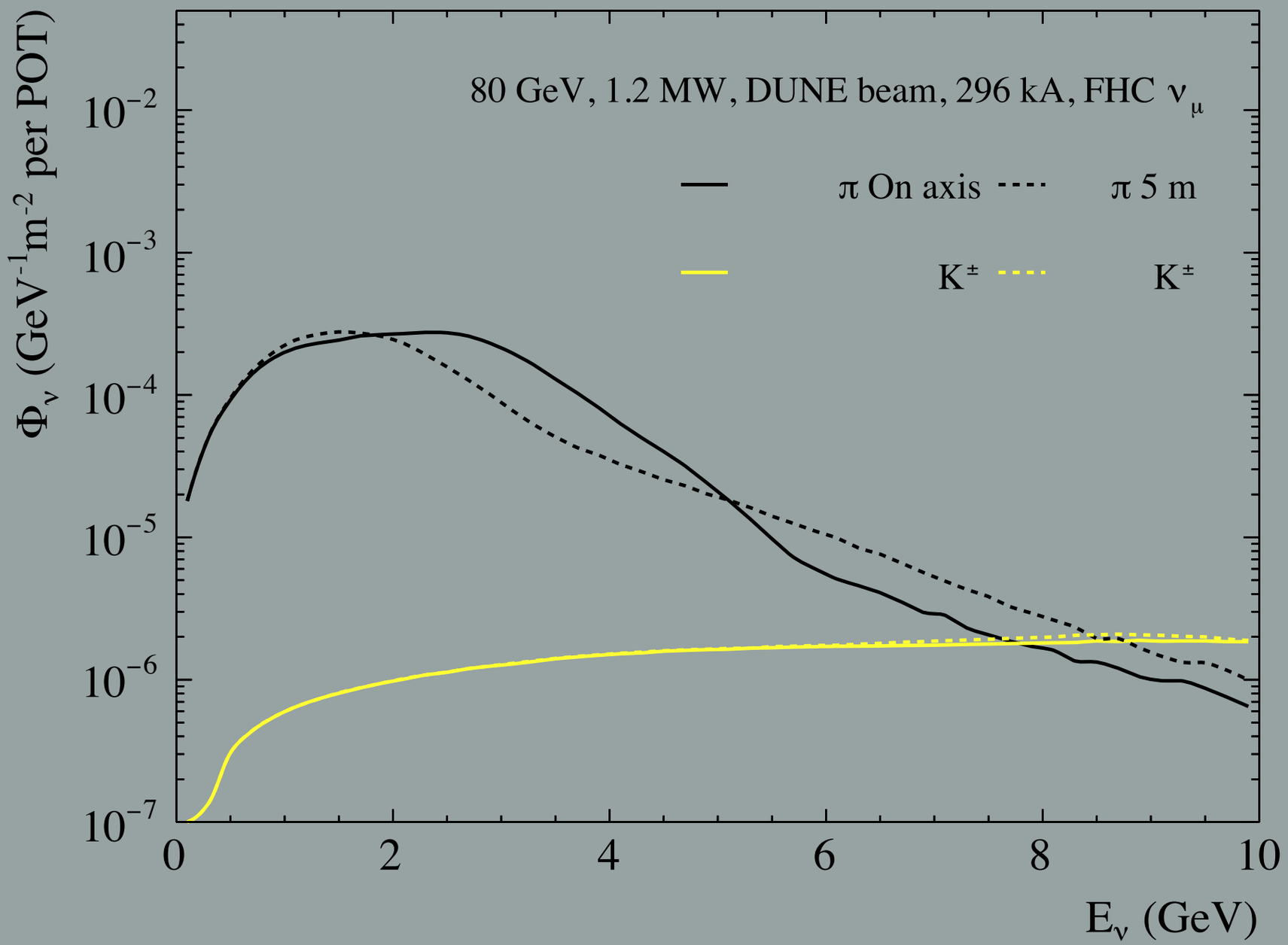
FLUX PREDICTIONS - ON AXIS



FLUX PREDICTIONS — OFF AXIS



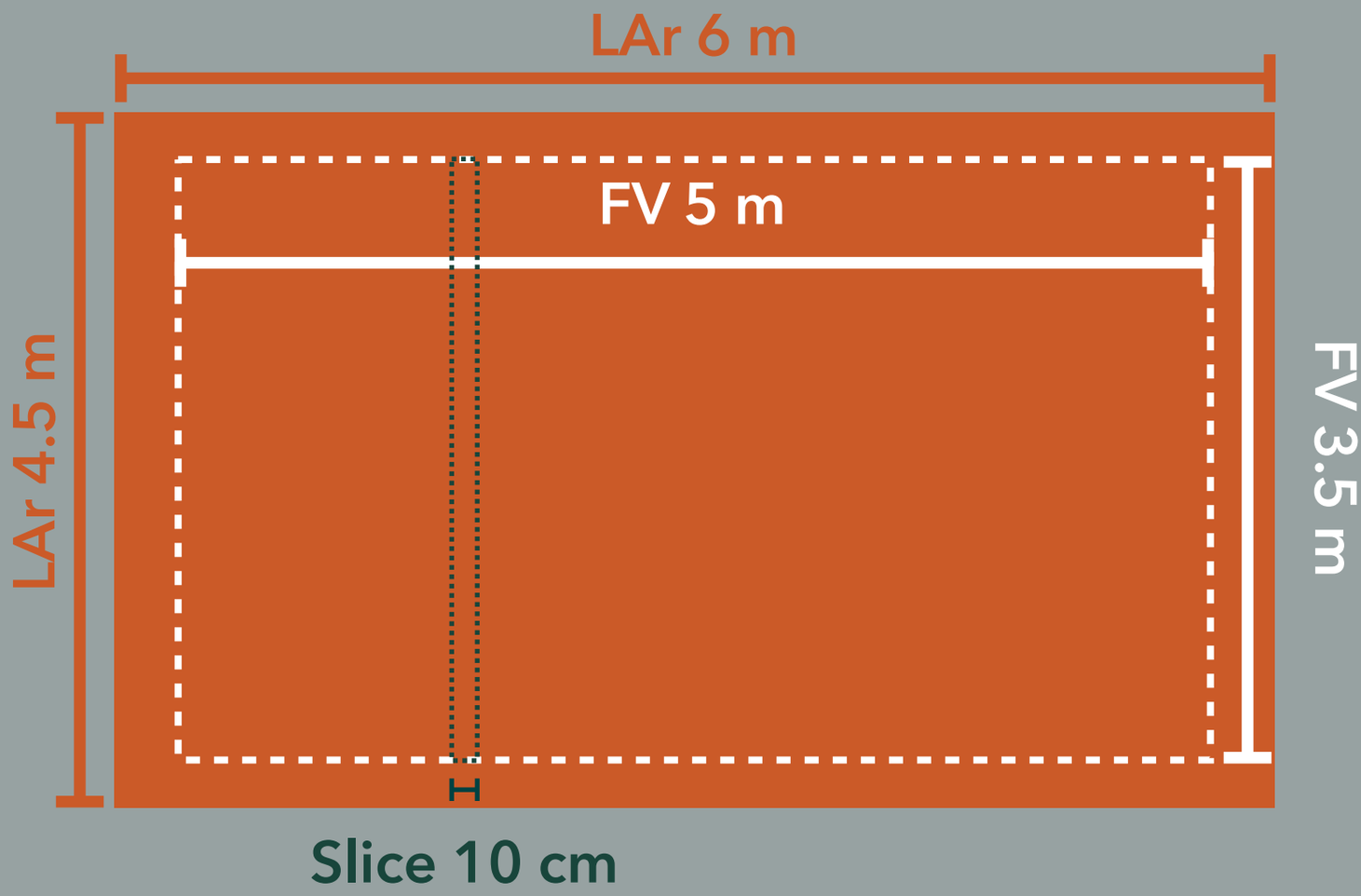
FLUX PREDICTIONS — PARENT SPECIES



- K0 and mu parents contribute less than 1E-7 per m^2 per POT

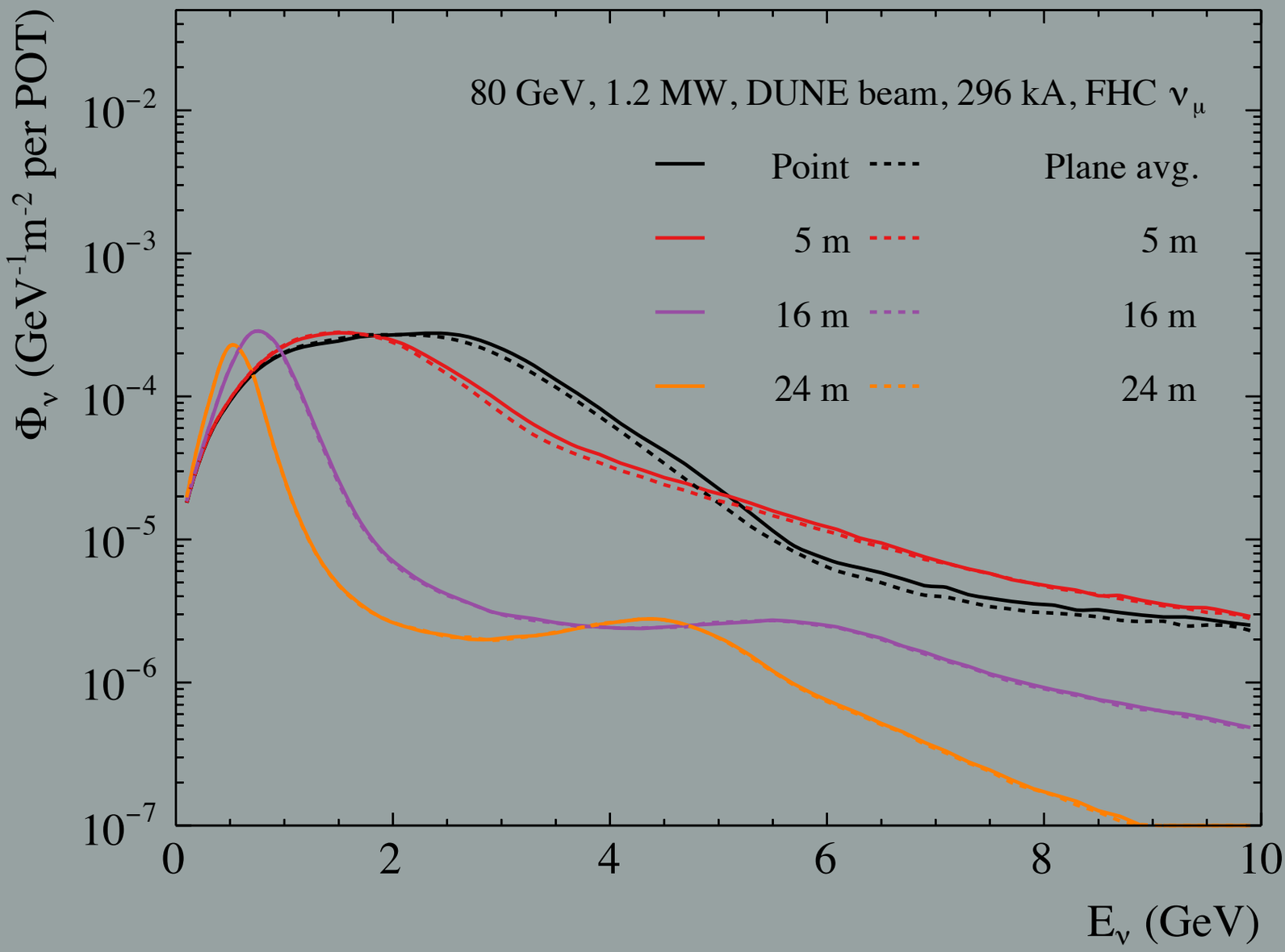
EVENT RATE PREDICTIONS

- LAr WLH: 6mx5mx4.5m
- Lose 0.5m each side for FV.
- Split FV up into 50 x 10 cm slices: 0.1mx4mx3.5m
  - Each: 1,954 kg LAr
- Choose some ‘arbitrary’ positions:
  - On-axis, 8m, 16m, 24m



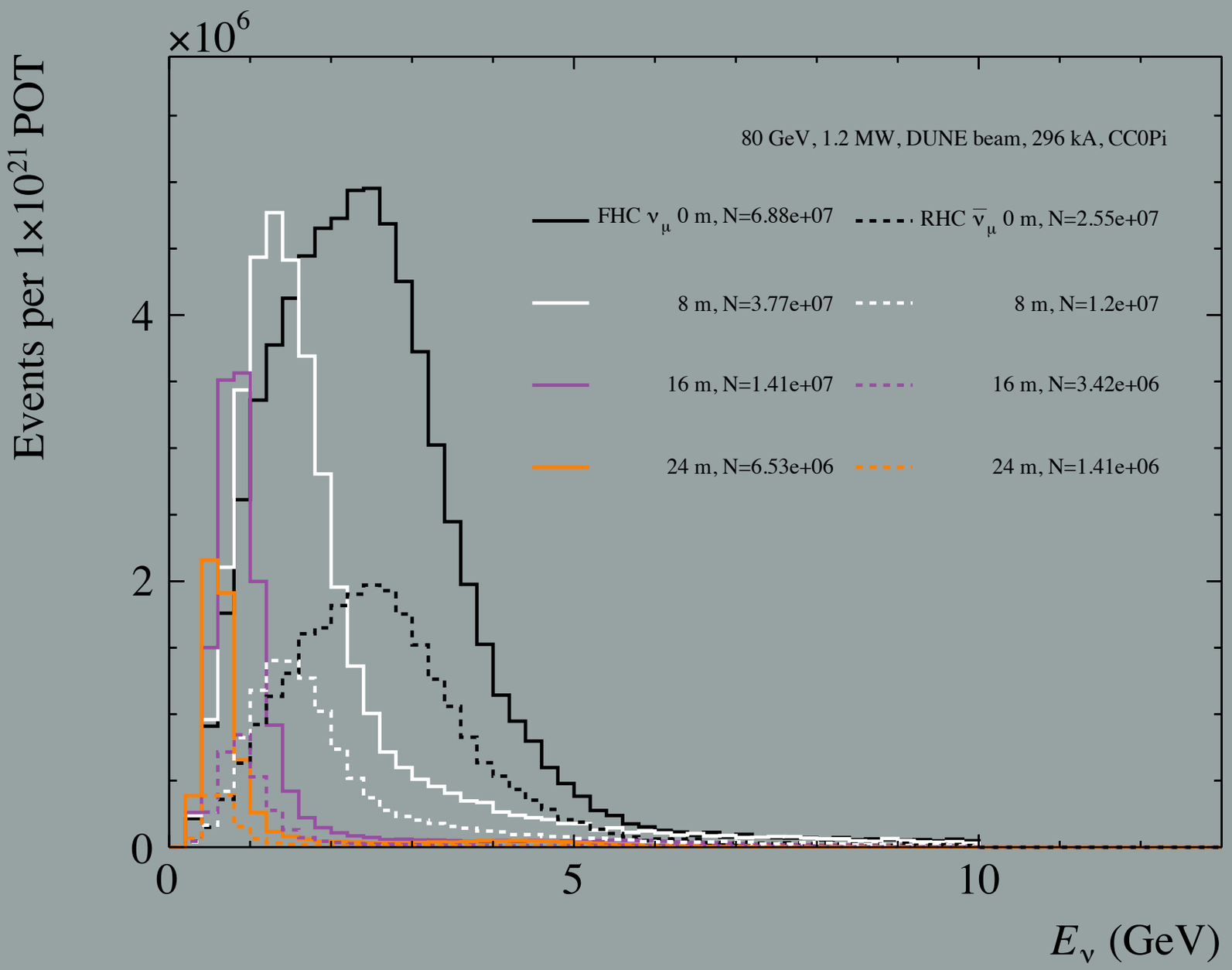
Slice 10 cm

FLUX PREDICTIONS — PLANE-AVERAGED



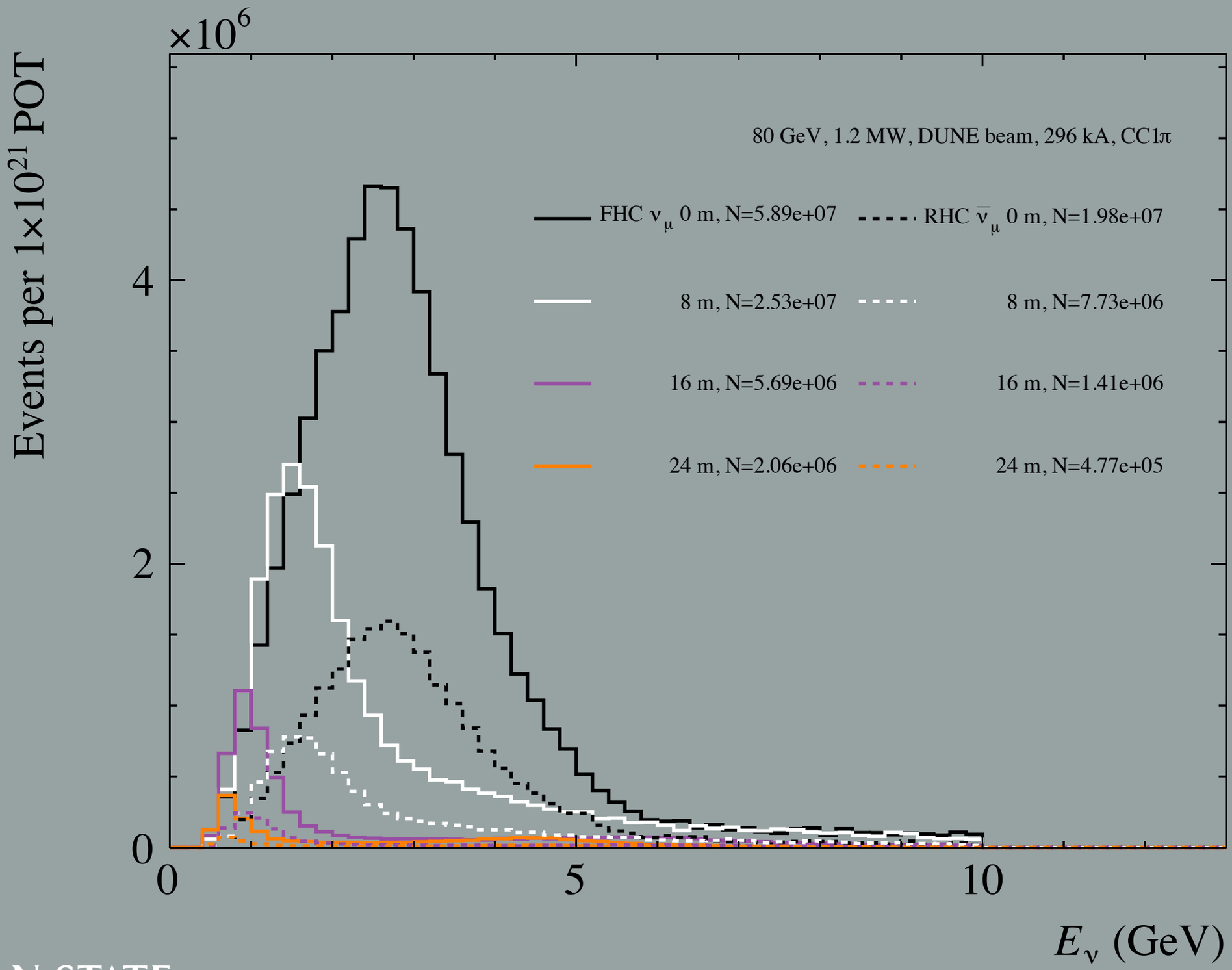
- Neutrinos are shot randomly through the plane, rather than through a point, to account for detector slice width.

EVENT RATES — CC0PI

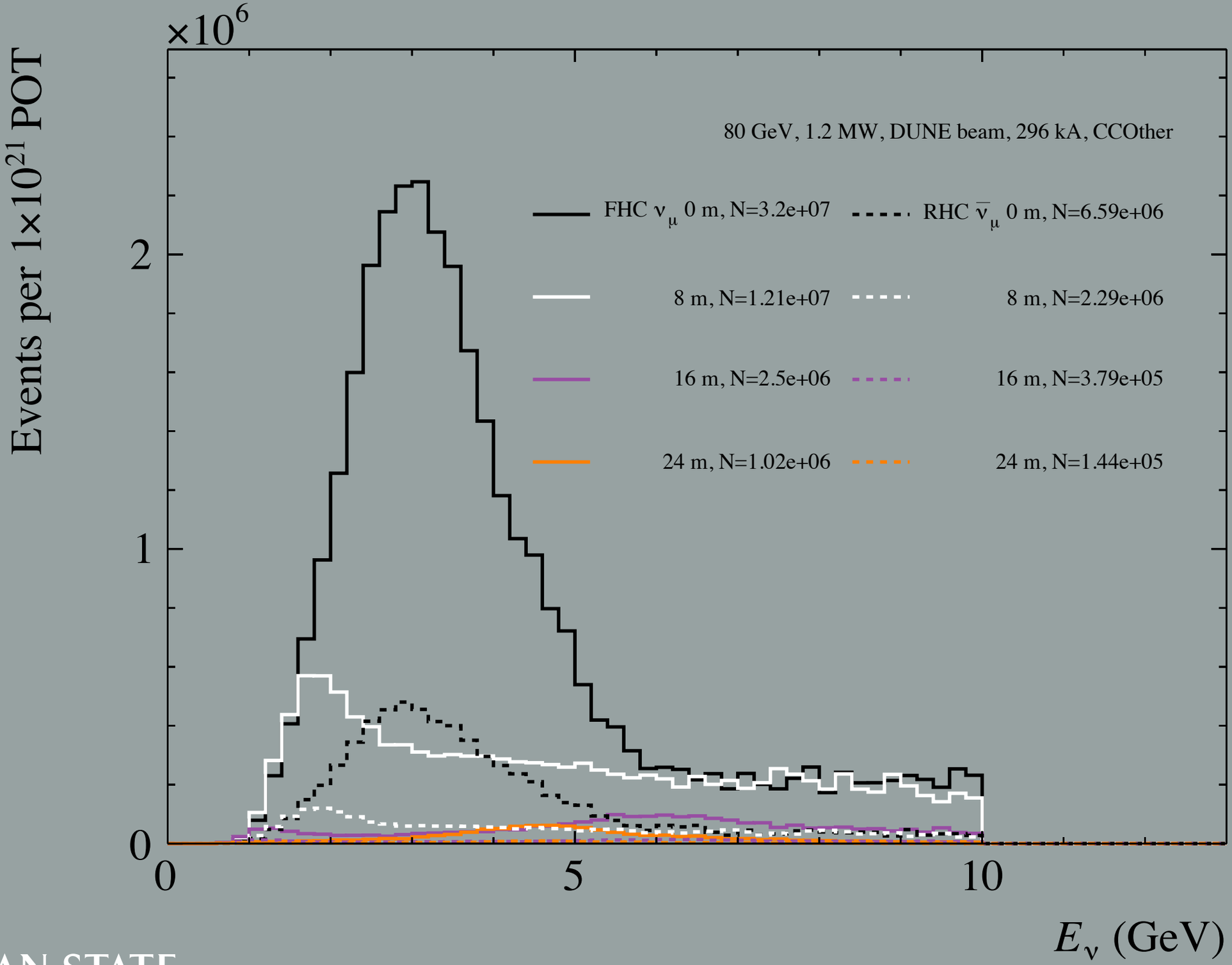


- 98×10^3 kg FV used for these ev rates.

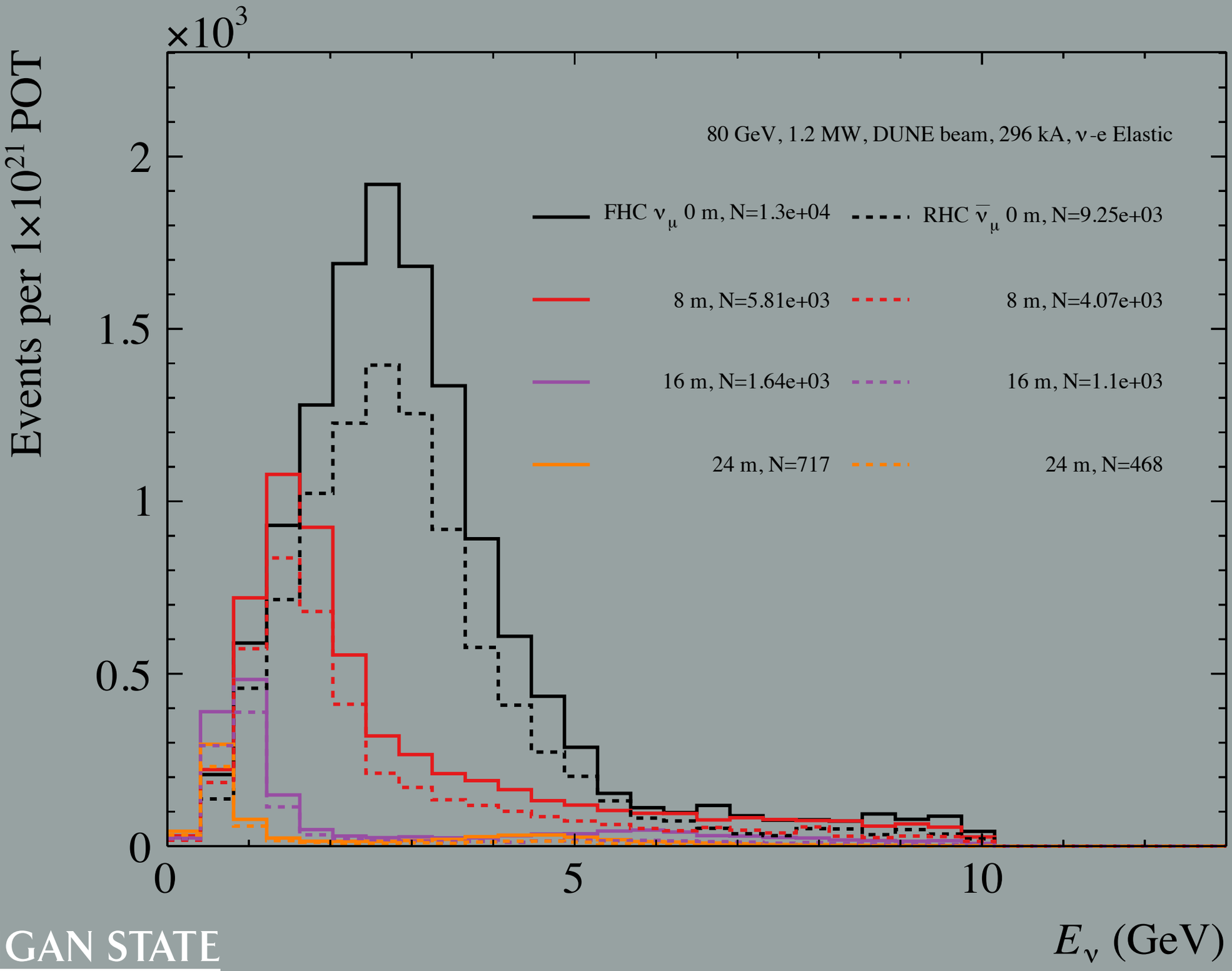
EVENT RATES — CC1PI



EVENT RATES — CCOTHER



EVENT RATES — NU - E ELASTIC



PLANS

- Generate flux prediction with shifted parameters
  - Make large uncertainty covmats that cover flux prediction at more than one angle.
- Revitalise the osc spectrum fitting code — What do ‘measurements’ using realistic event rate predictions look like?
- What run plans can we come up with?
- How to FOM a given run plan for us and also so as not to upset other groups stats-wise?

WE APOLOGISE FOR ANY INCONVENIENCE

THANK YOU

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