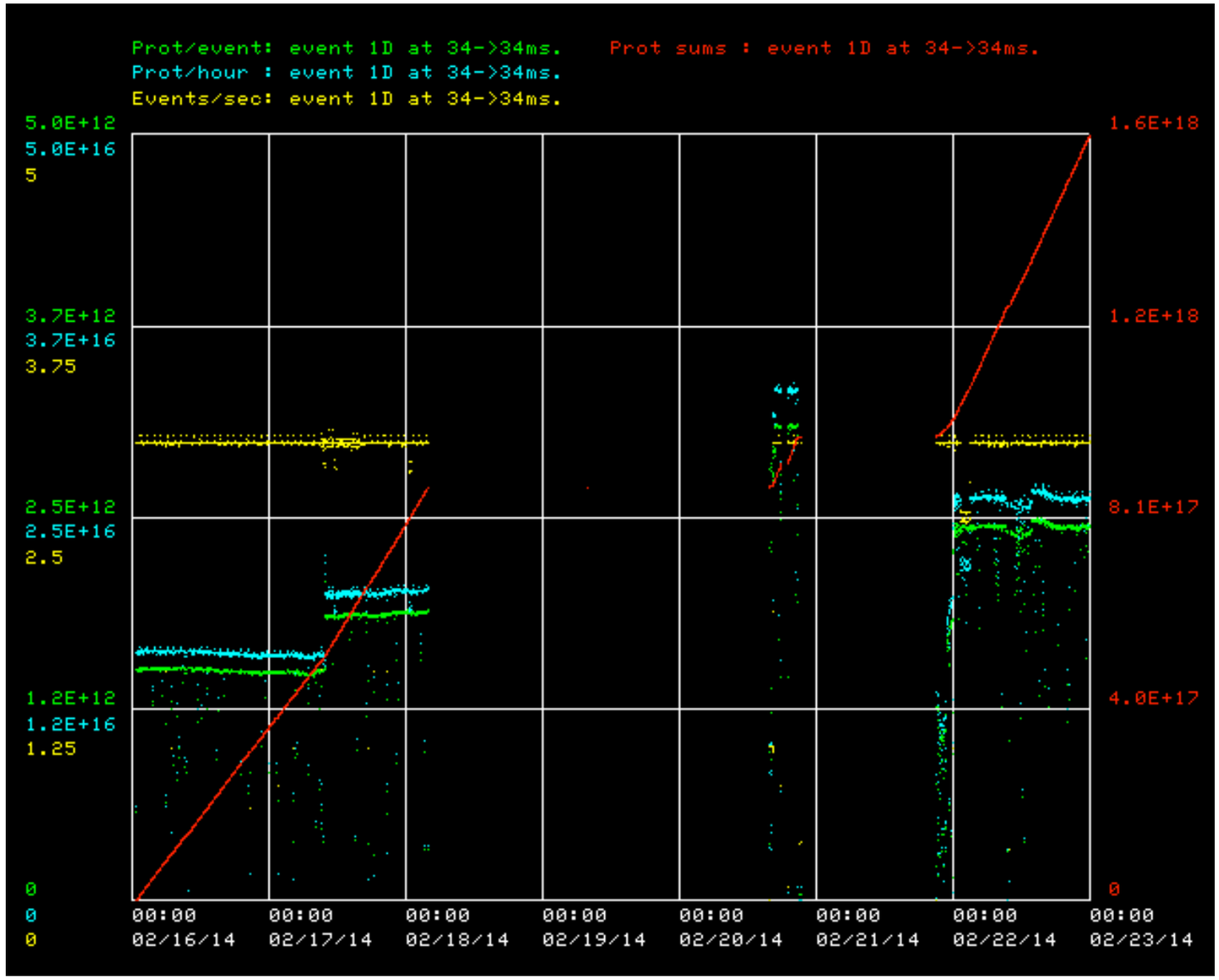
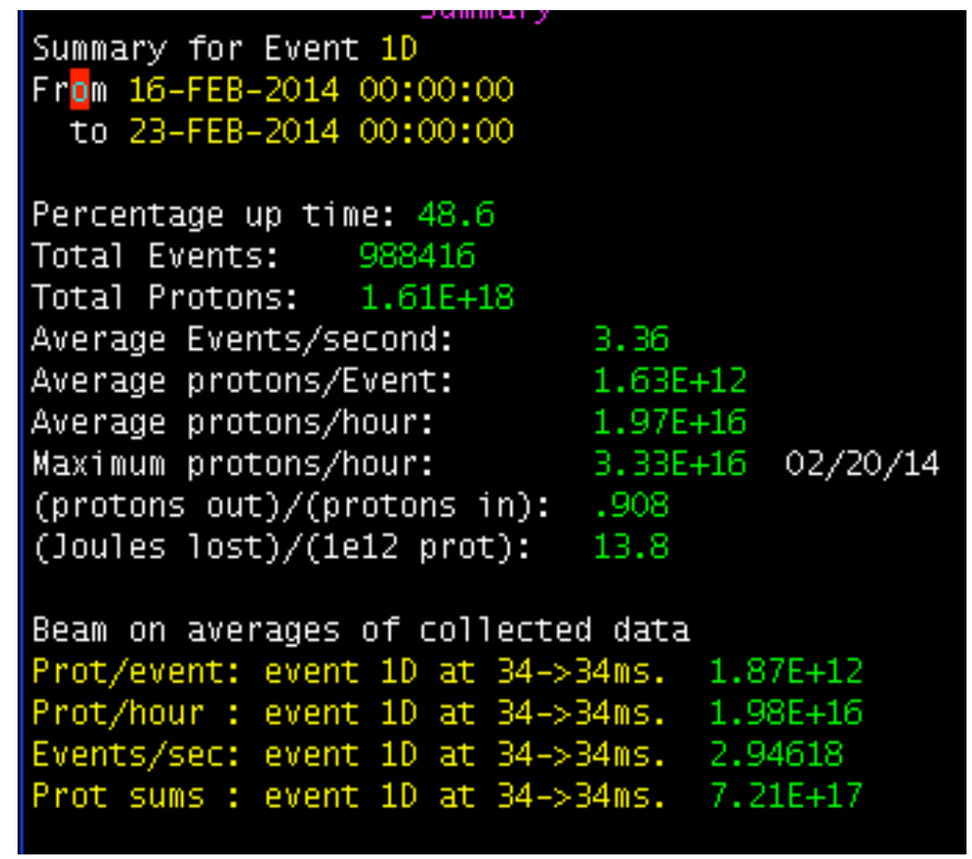
MiniBooNE Beam-Dump run update

Feb 24th 2014

Ranjan Dharmapalan
for the MiniBooNE Collaboration

BNB





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Summary for Event 1D
From 16-FEB-2014 00:00:00
  to 23-FEB-2014 00:00:00

Percentage up time: 48.6
Total Events:     988416
Total Protons:    1.61E+18
Average Events/second:        3.36
Average protons/Event:        1.63E+12
Average protons/hour:         1.97E+16
Maximum protons/hour:         3.33E+16  02/20/14
(protons out)/(protons in):   .908
(Joules lost)/(1e12 prot):    13.8

Beam on averages of collected data
Prot/event: event 1D at 34->34ms.  1.87E+12
Prot/hour : event 1D at 34->34ms.  1.98E+16
Events/sec: event 1D at 34->34ms.  2.94618
Prot sums : event 1D at 34->34ms.  7.21E+17
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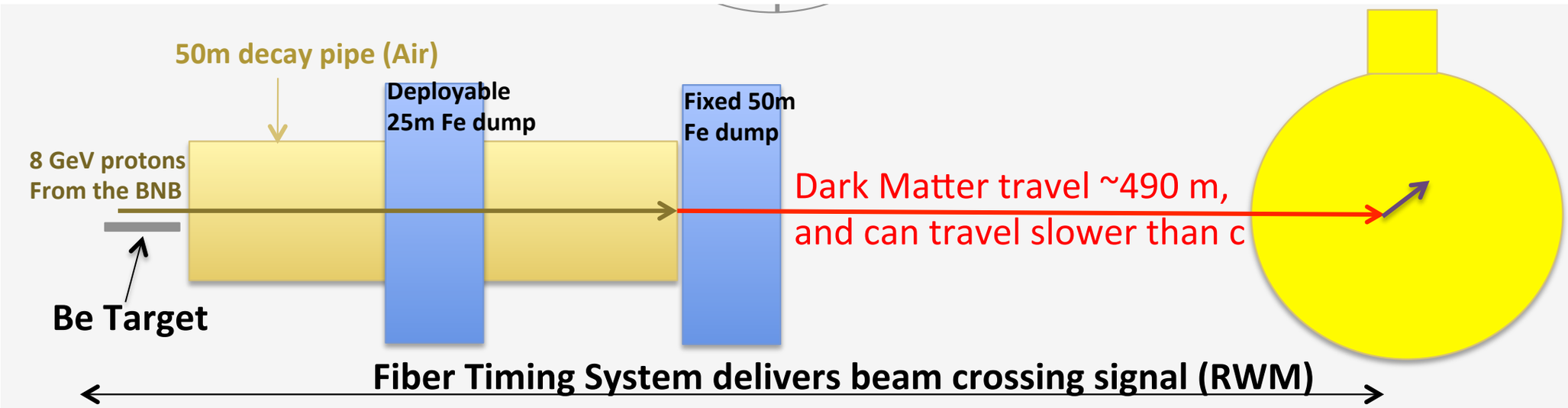
- 48% uptime. Total protons for the week =1.6E18
- Smooth running on detector side, collected data when beam was up.

Neutrino rate reduction in beam-dump mode



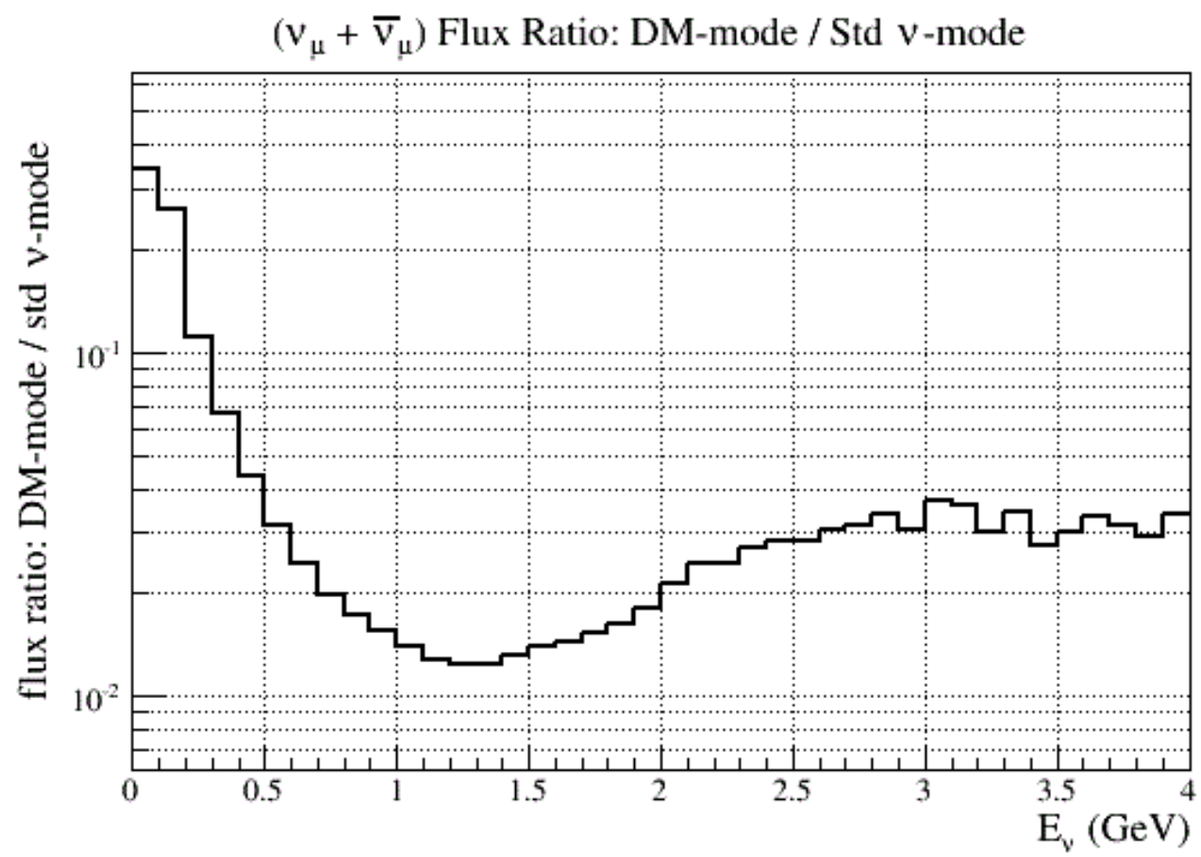
- Neutrinos from proton-air interactions. Not constrained by HARP, hence large systematic error in prediction.
- MC prediction (neutrino mode/beam dump) = **67**
  (large systematic errors)

- **Use data to infer the rate reduction**

CCQE muon (neutrino mode/beam dump) = **44 +/- 3**
NC pi0's (neutrino mode/beam dump) = **47.5 +/- 10.3**

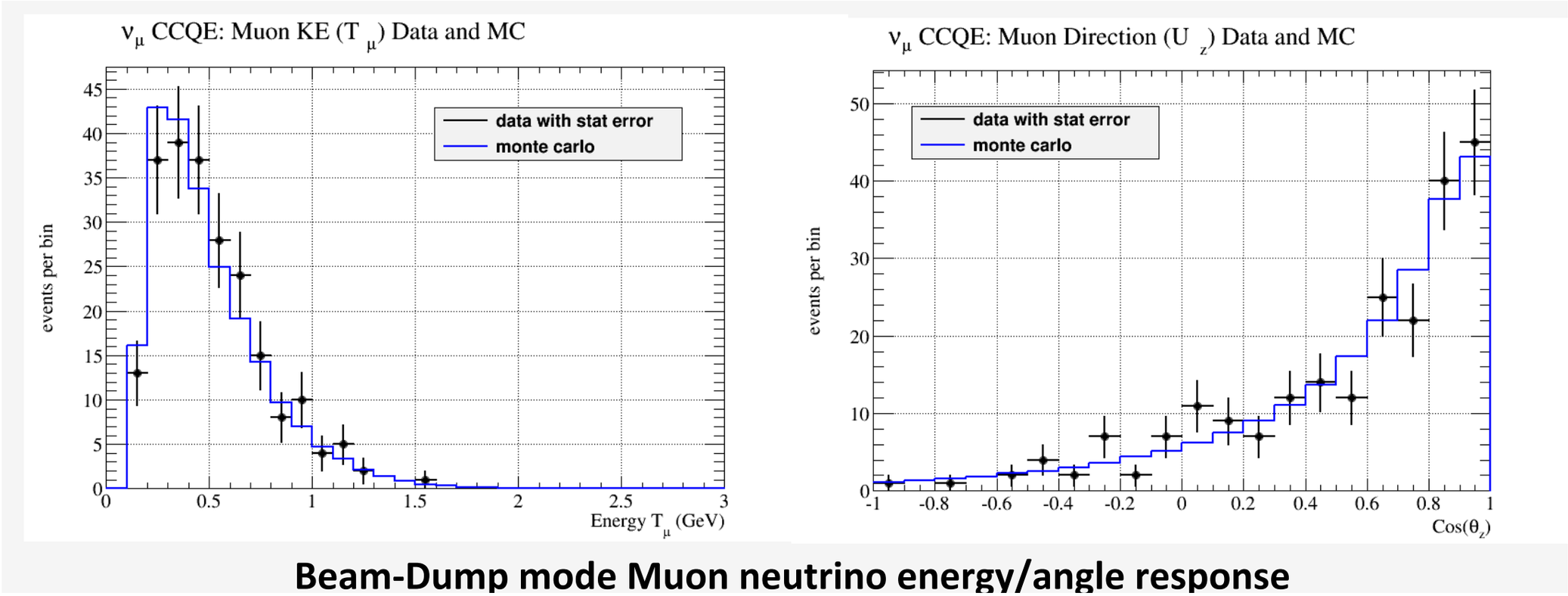
Kinematic distribution: Shape agrees, normalization different.

- **Predict NCE rate based on other channels.**

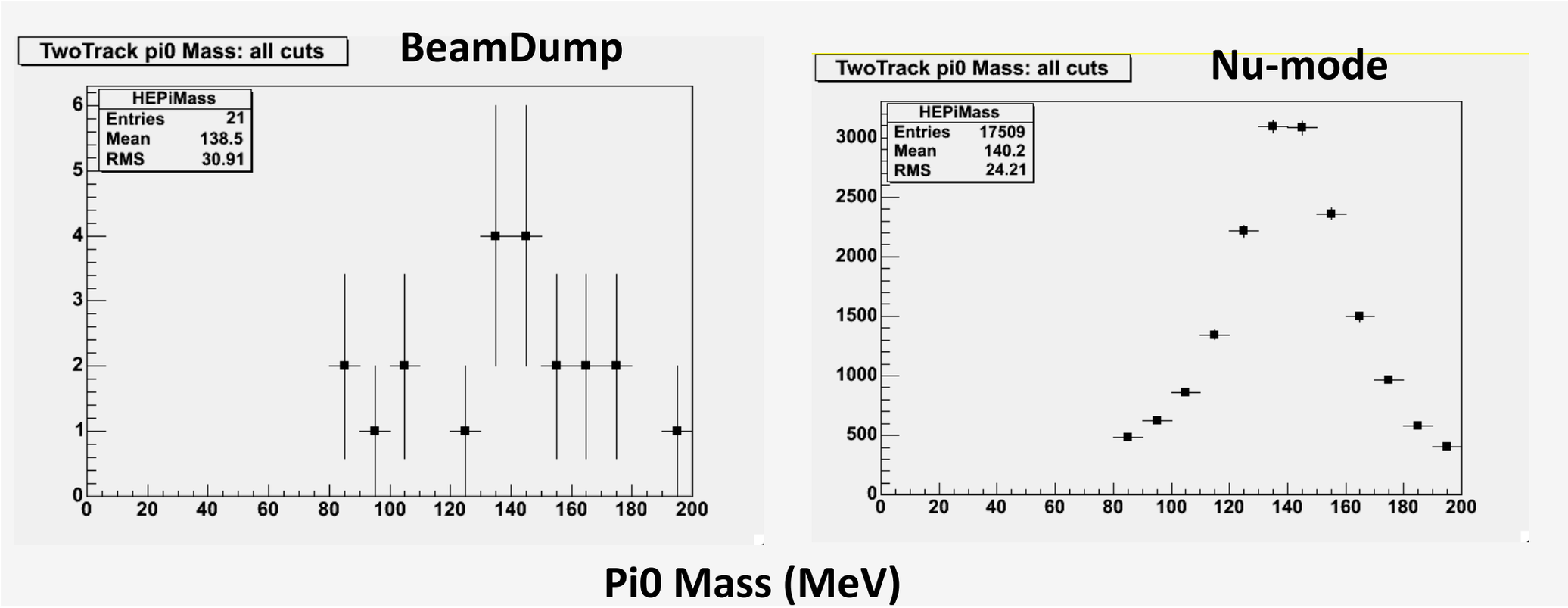


Neutrino flux reduction in beam-dump mode relative to neutrino mode as a function of neutrino energy.

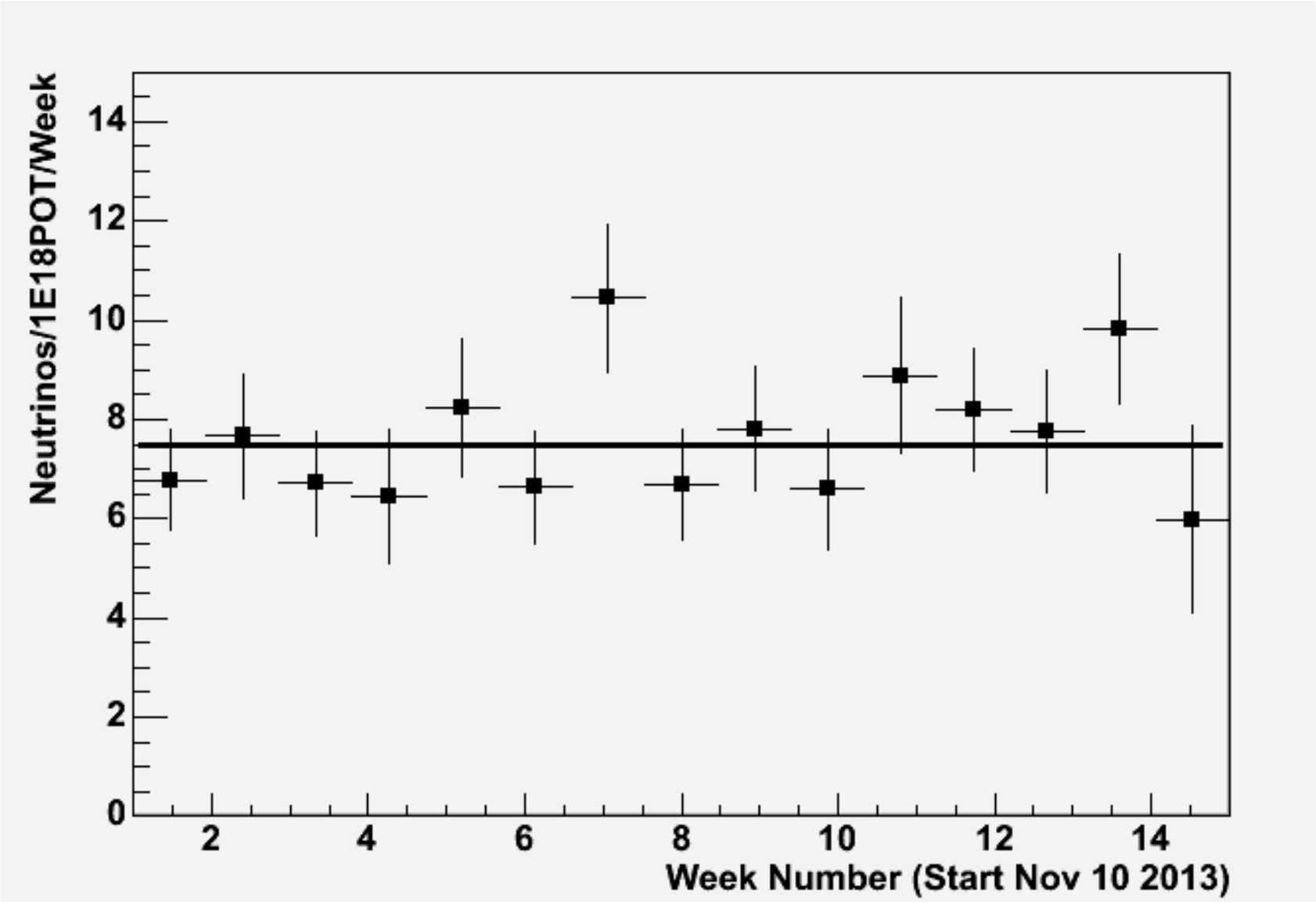
Neutrino rate reduction in beam-dump mode



Beam-Dump mode Muon neutrino energy/angle response



Neutrino/POT/week in beam-dump mode



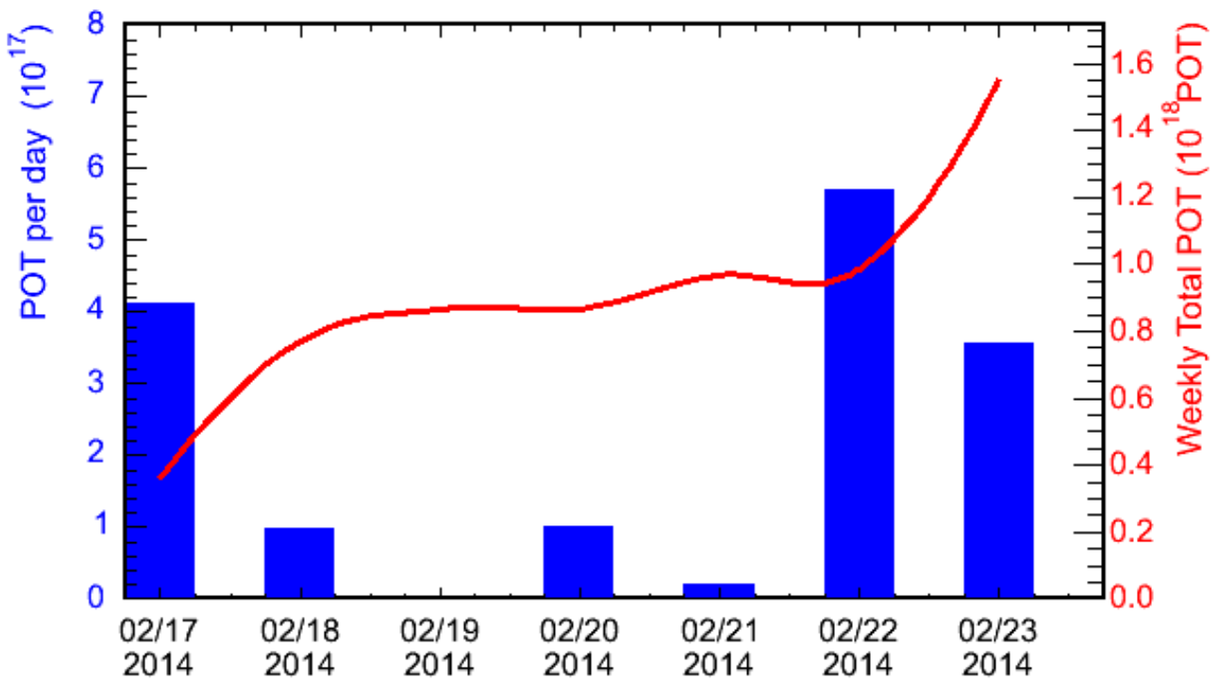
Shows of beam and detector stability

Summary

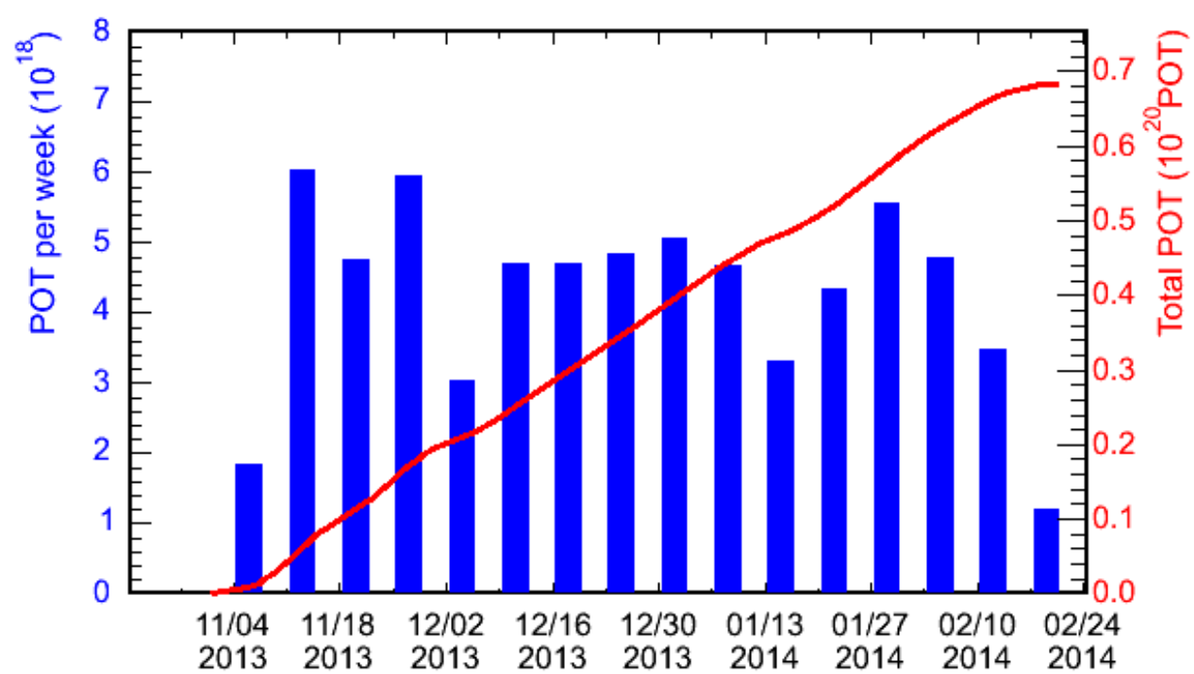
Collected all protons while beam was ON

Stable running at the detector.

Last week

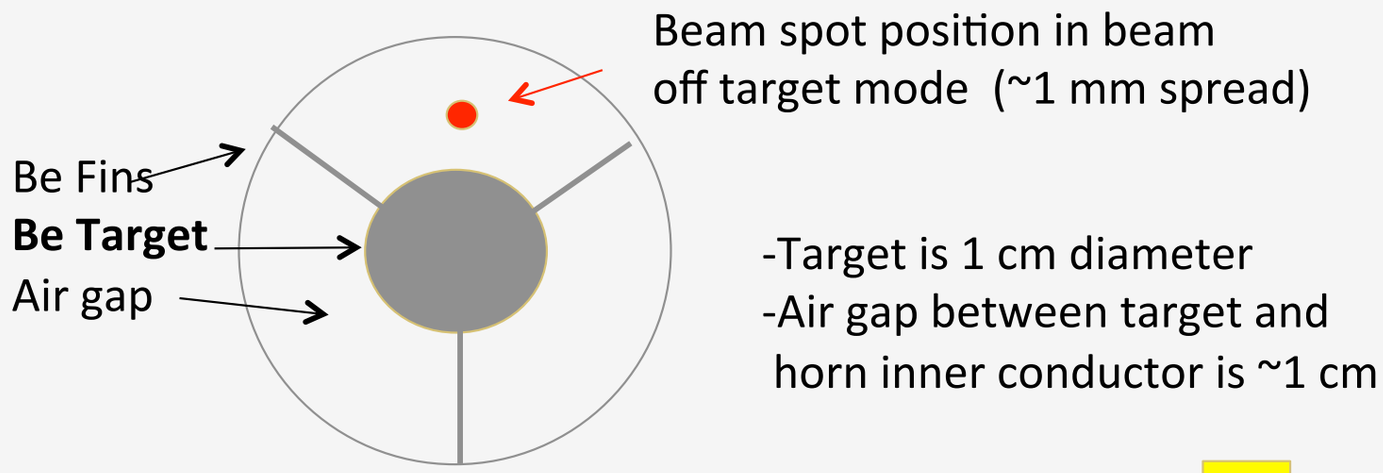


Total beam-dump run

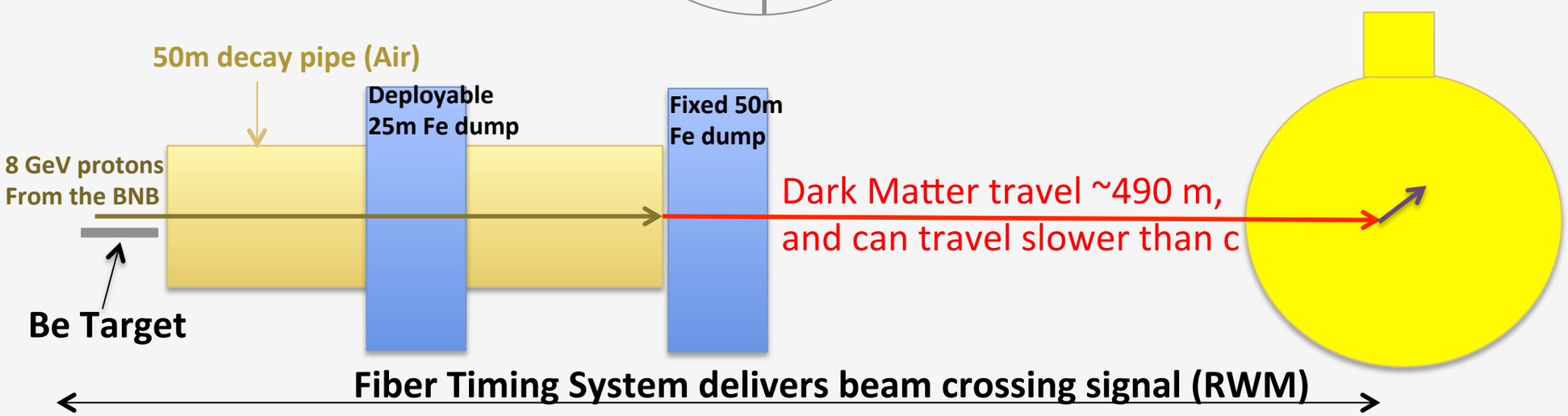


Beam Off Target Running (Beam-Dump Mode)

MB has the capability to steer the protons past the target and onto the 25m or 50m iron dump



-Target is 1 cm diameter
-Air gap between target and horn inner conductor is ~1 cm



- π^0 and η produced by protons in the Fe quickly decay producing dark matter.
- Charged mesons are absorbed in the Fe before decaying, which significantly reduces the neutrino flux (still some production from proton-Air interactions).

3