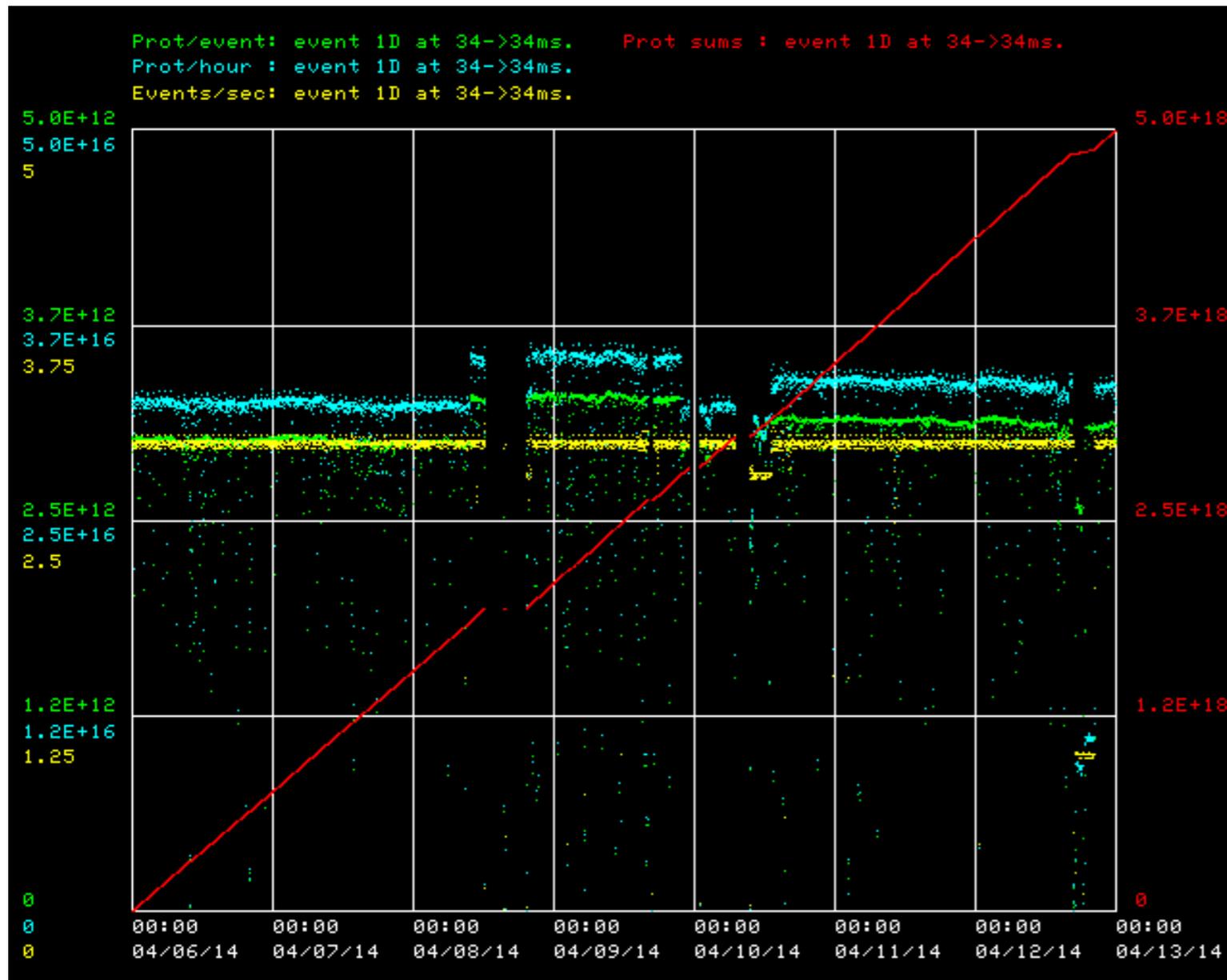


MiniBooNE Beam-Dump Mode Run Update

April 14th 2014

Ranjan Dharmapalan
for the MiniBooNE Collaboration

BNB



summary

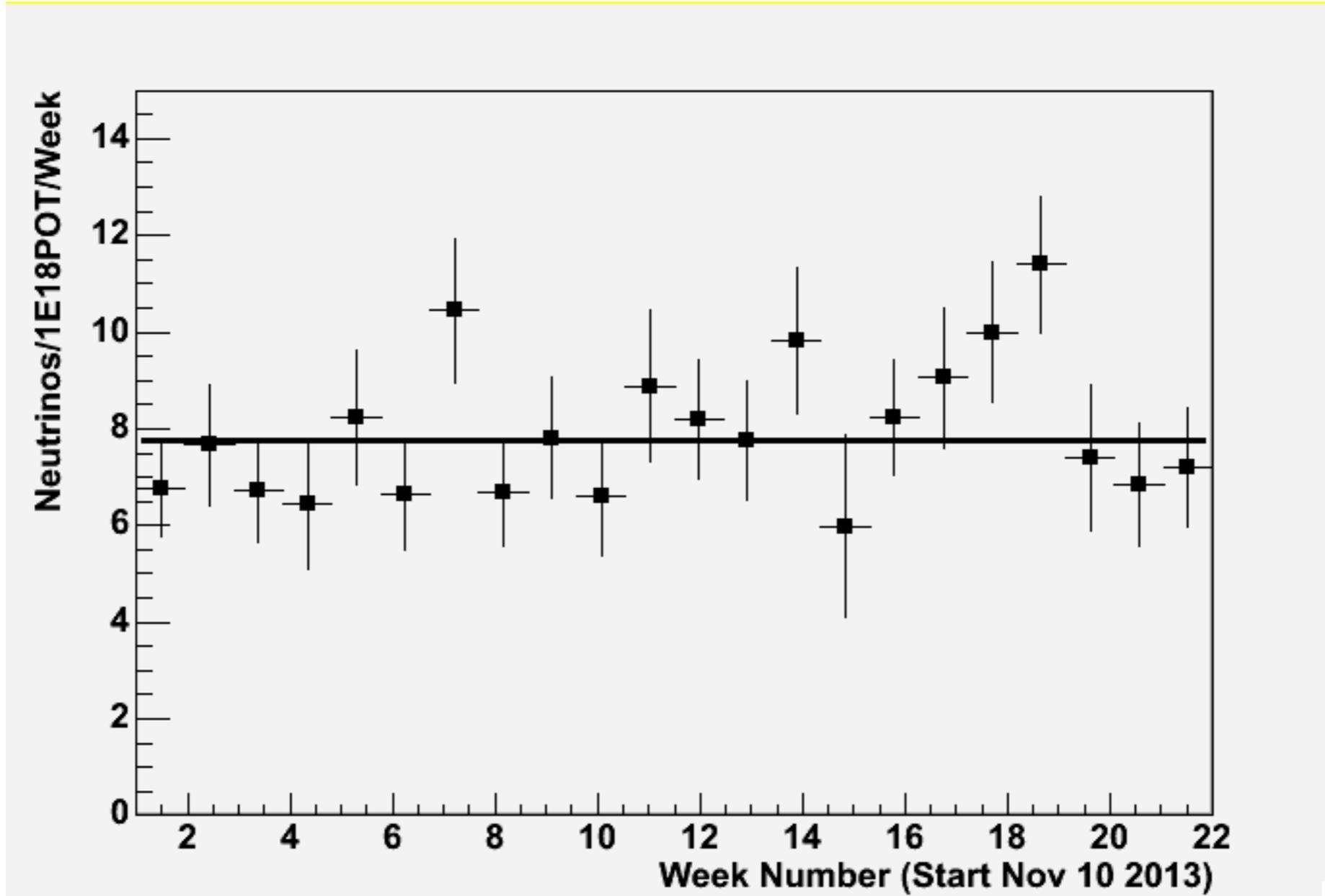
Summary for Event 1D
From 06-APR-2014 00:00:00
to 13-APR-2014 00:00:00

Percentage up time: 94.6
Total Events: 1747008
Total Protons: 4.96E+18
Average Events/second: 3.05
Average protons/Event: 2.84E+12
Average protons/hour: 3.12E+16
Maximum protons/hour: 3.56E+16 04/09/14
(protons out)/(protons in): .918
(Joules lost)/(1e12 prot): 12.8

Beam on averages of collected data
Prot/event: event 1D at 34->34ms. 3.01E+12
Prot/hour : event 1D at 34->34ms. 3.20E+16
Events/sec: event 1D at 34->34ms. 2.946647
Prot sums : event 1D at 34->34ms. 2.49E+18

- BNB 94.6% uptime. Total protons for the week =4.96E18

MiniBooNE Detector



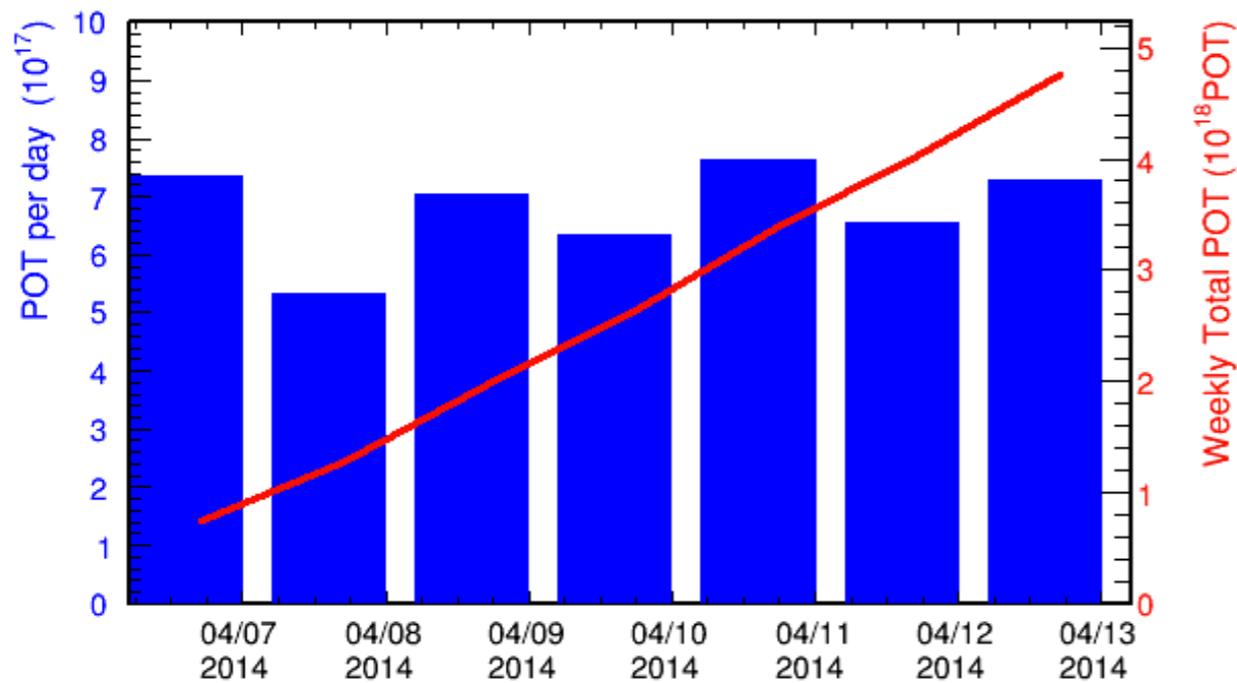
- Detector uptime 100%
- Muon energy and timing also as expected.

Summary

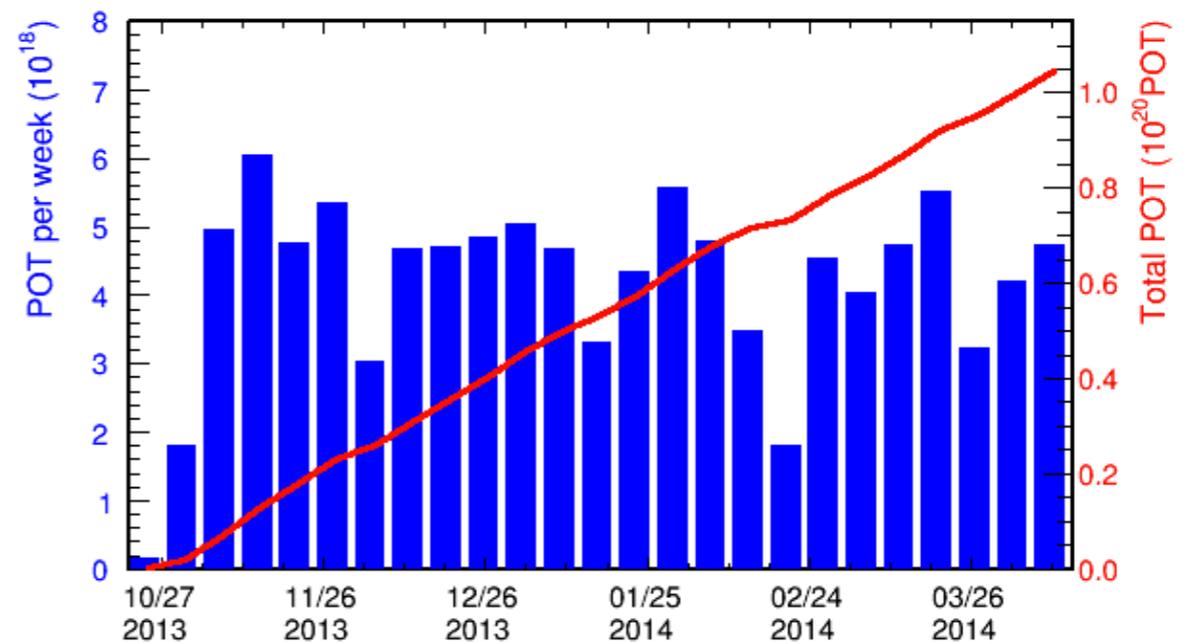
No issues to report

Stable running at the detector.

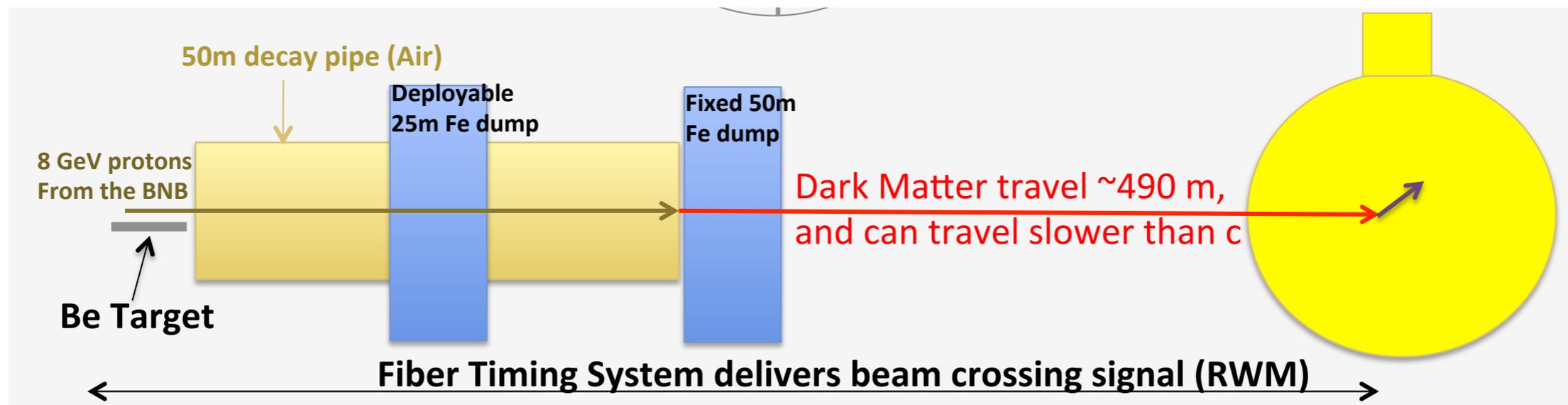
Last week



Current run



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)**

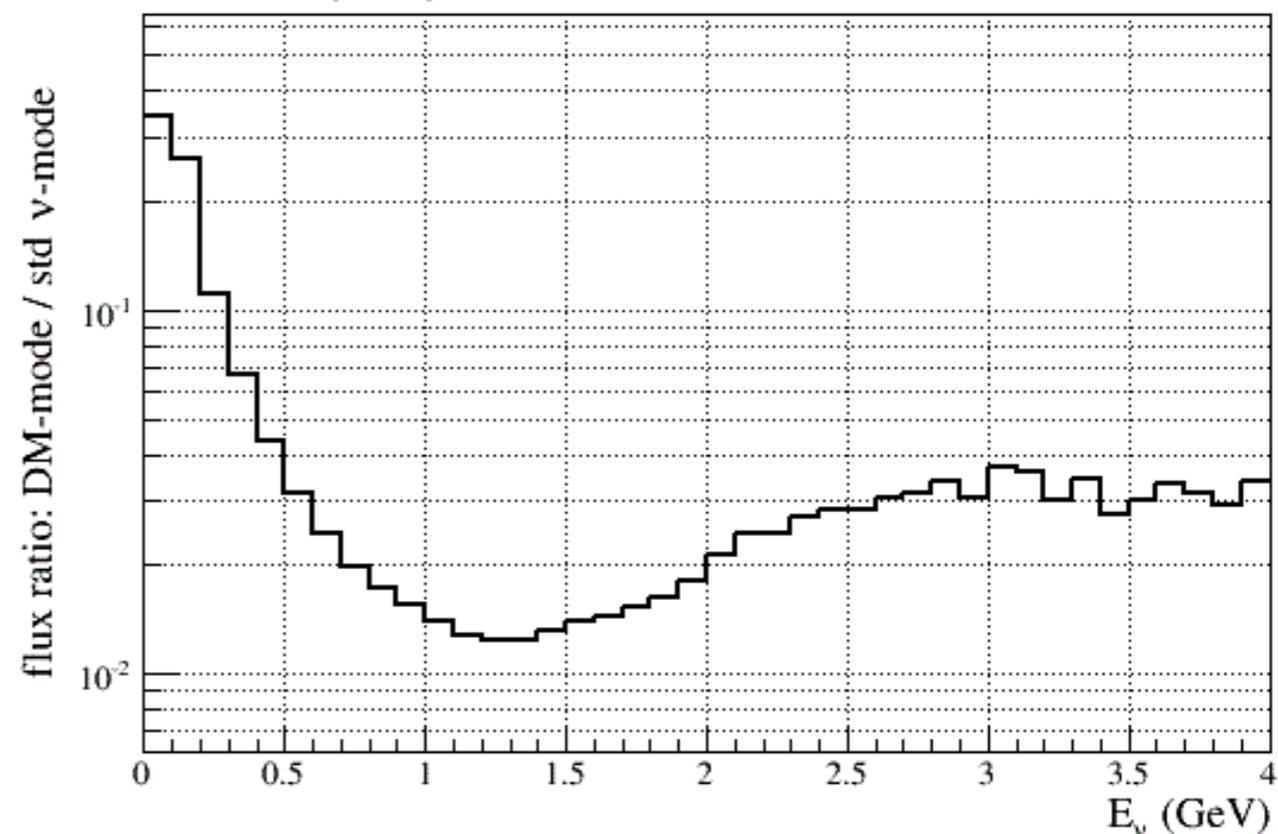
Use data to infer the rate reduction

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.

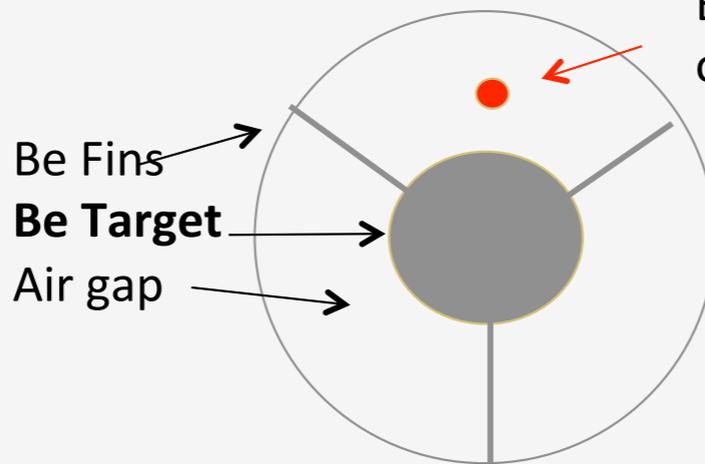
$(\nu_\mu + \bar{\nu}_\mu)$ Flux Ratio: DM-mode / Std ν -mode



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

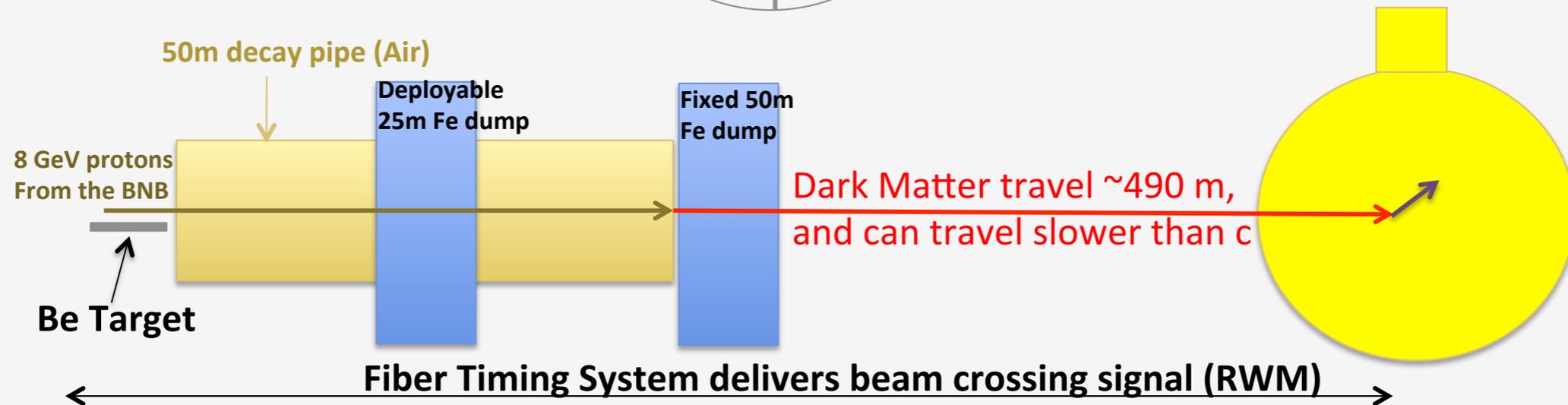
Beam Off Target Running (Beam-Dump Mode)

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



Beam spot position in beam off target mode (~1 mm spread)

- 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).