MiniBooNE Beam-Dump Mode Run Update

April14th 2014

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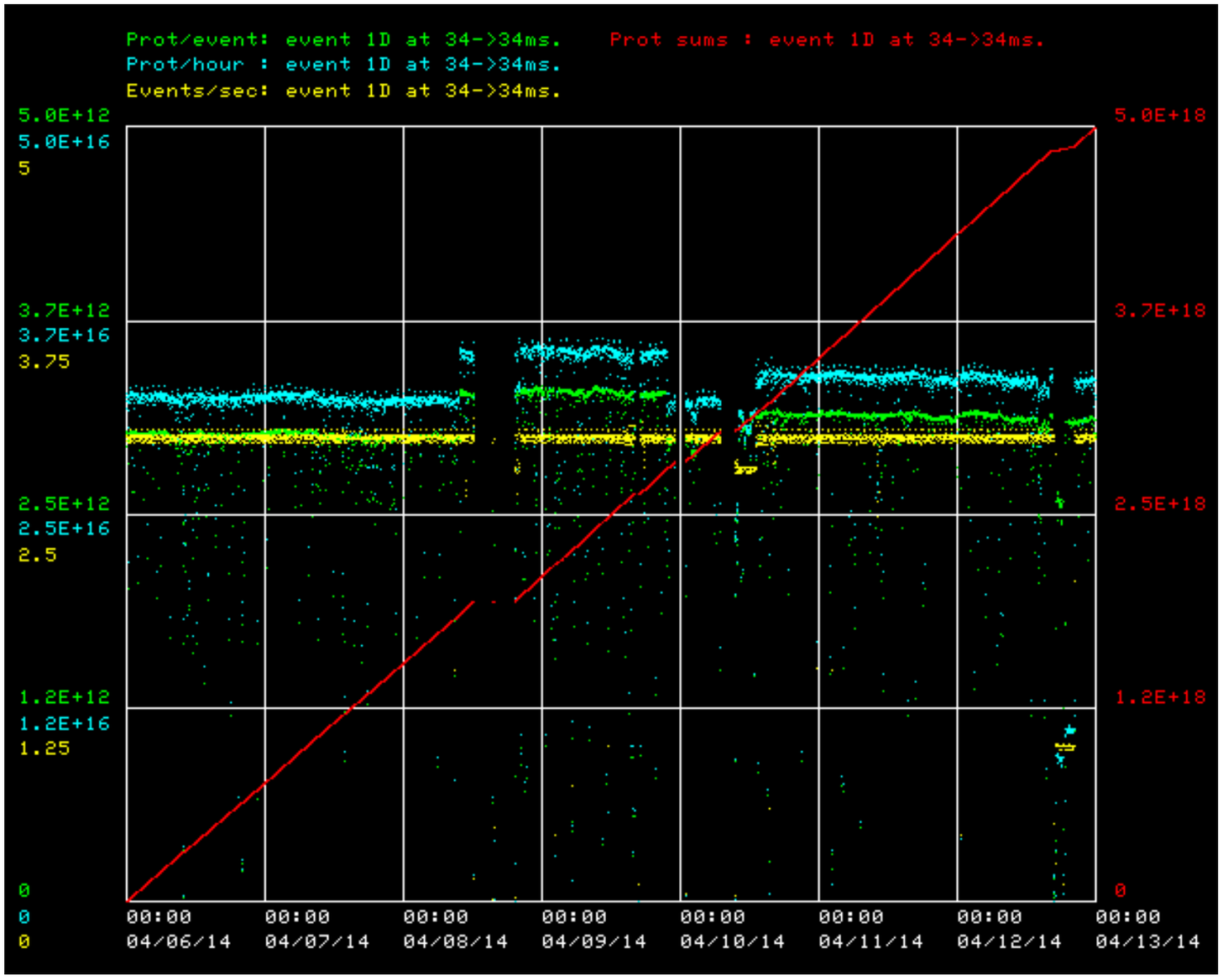
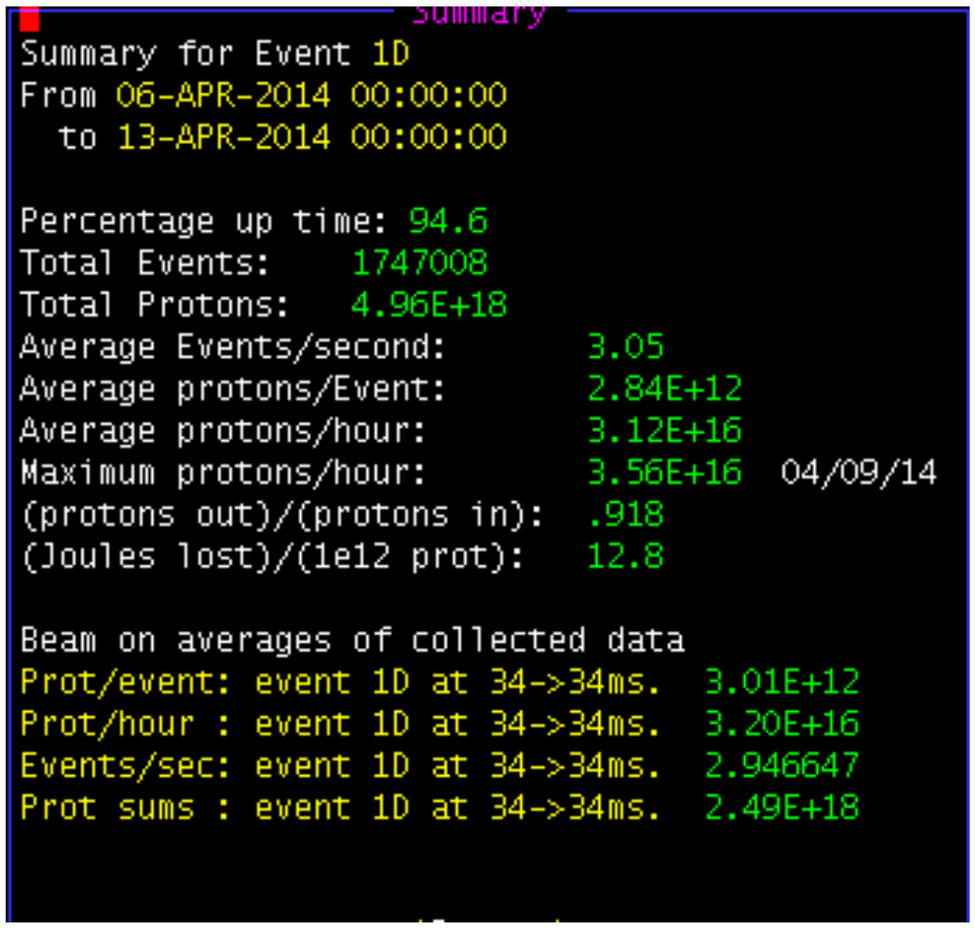
for the MiniBooNE Collaboration

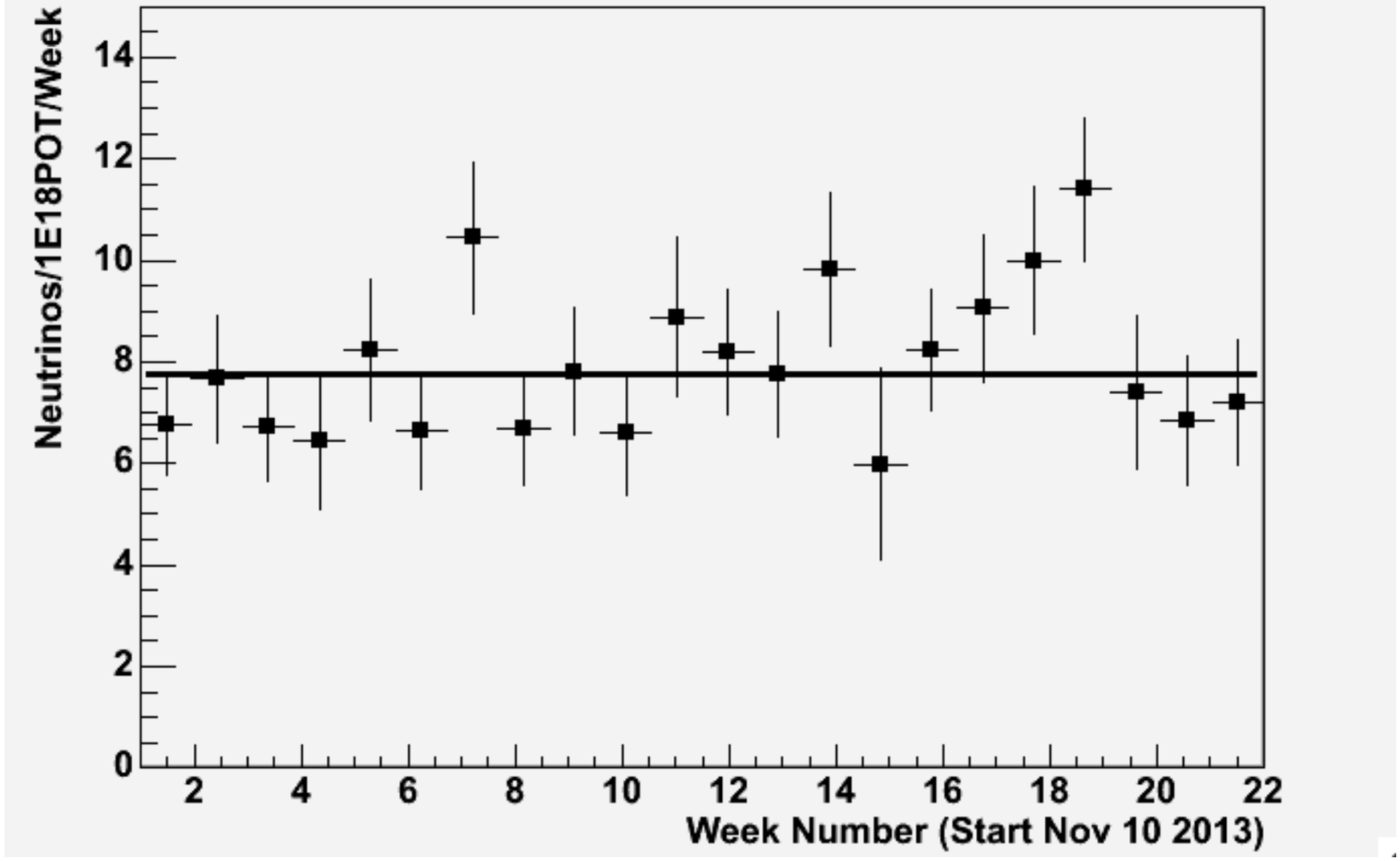
BNB





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

MiniBooNE Detector



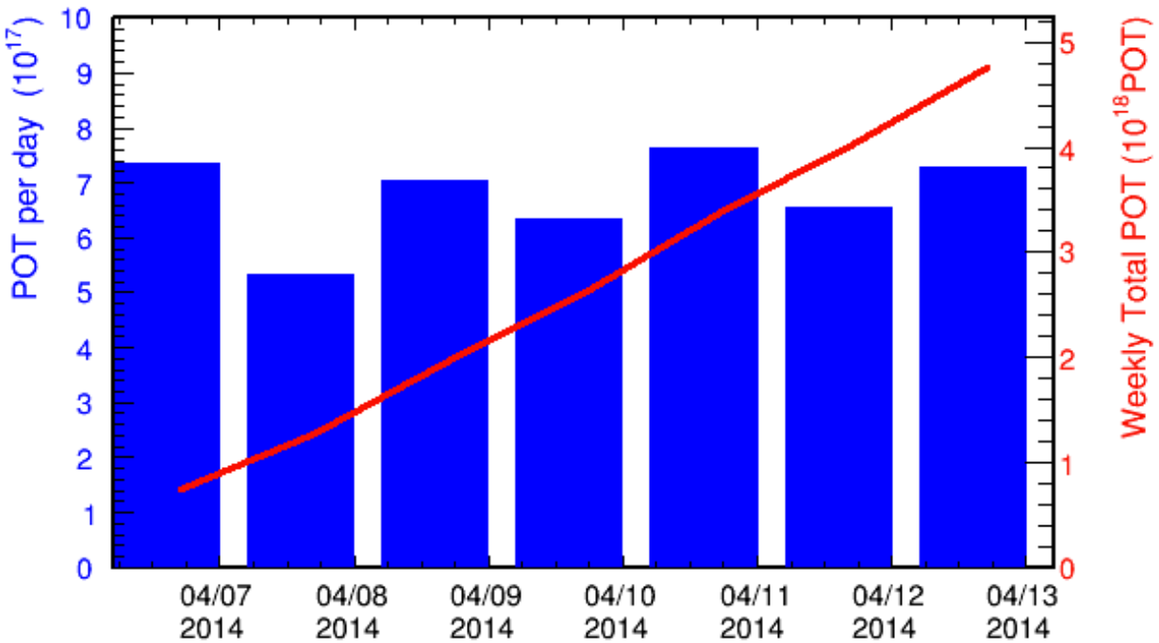
- Detector uptime 100%
- Muon energy and timing also as expected.

Summary

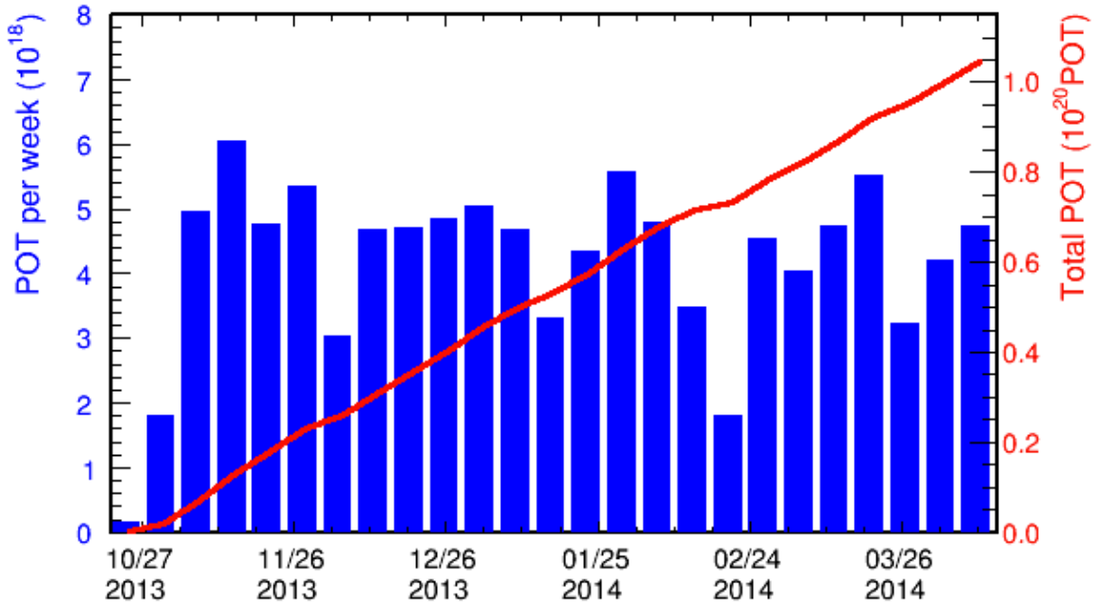
No issues to report

Stable running at the detector.

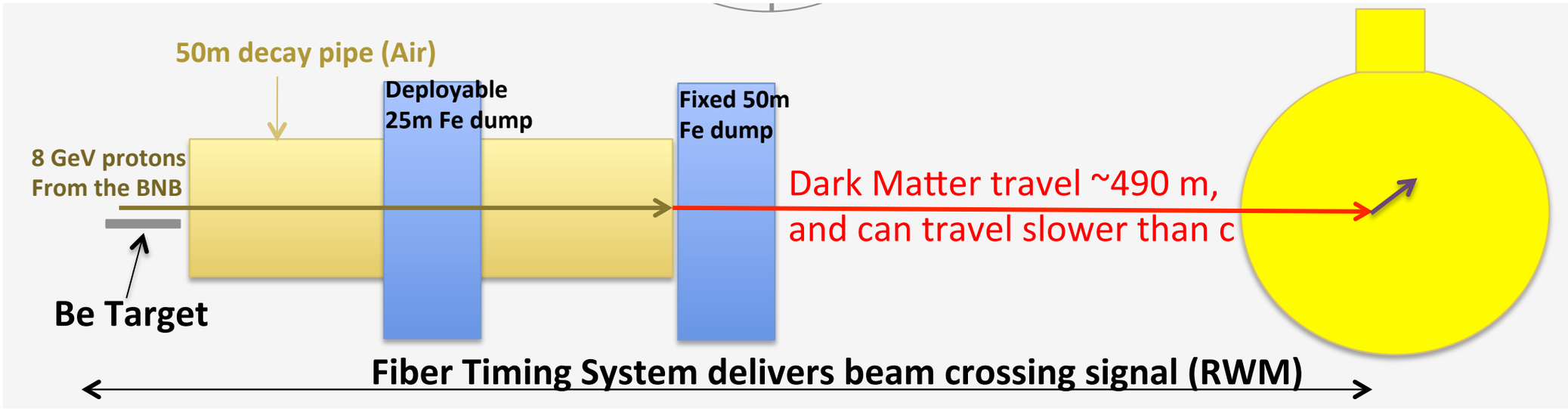
Last week



Current run



Neutrino rate reduction in beam-dump mode



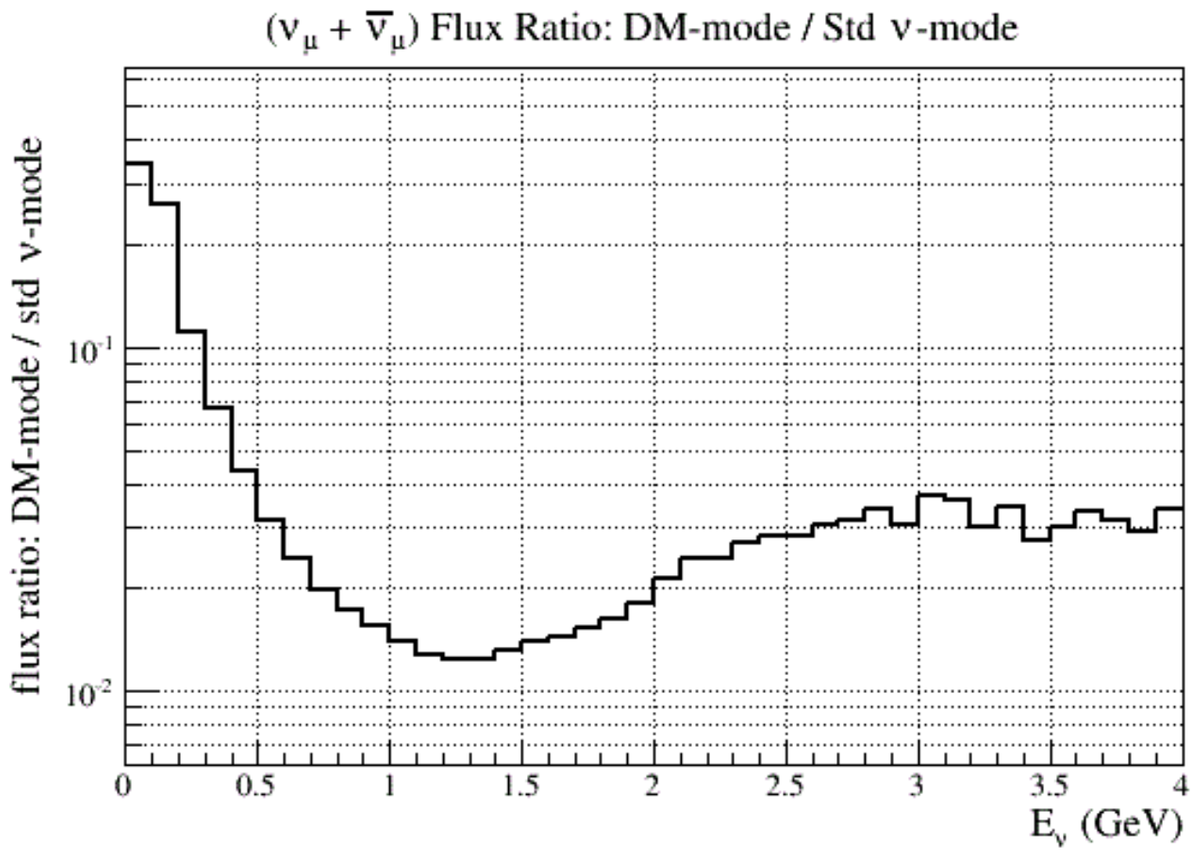
- Neutrinos from proton-air interactions. Not constrained by HARP, hence large systematic error in prediction.
- MC prediction (neutrino mode/beam dump) = **67** **(large systematic errors)**

- **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.

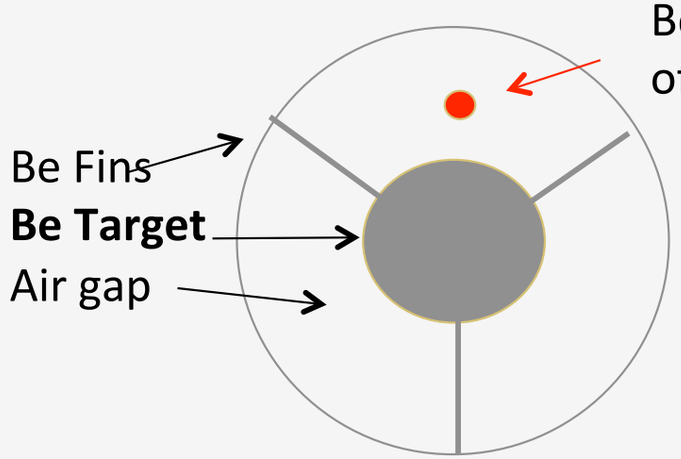
- **Predict NCE rate based on other channels.**



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

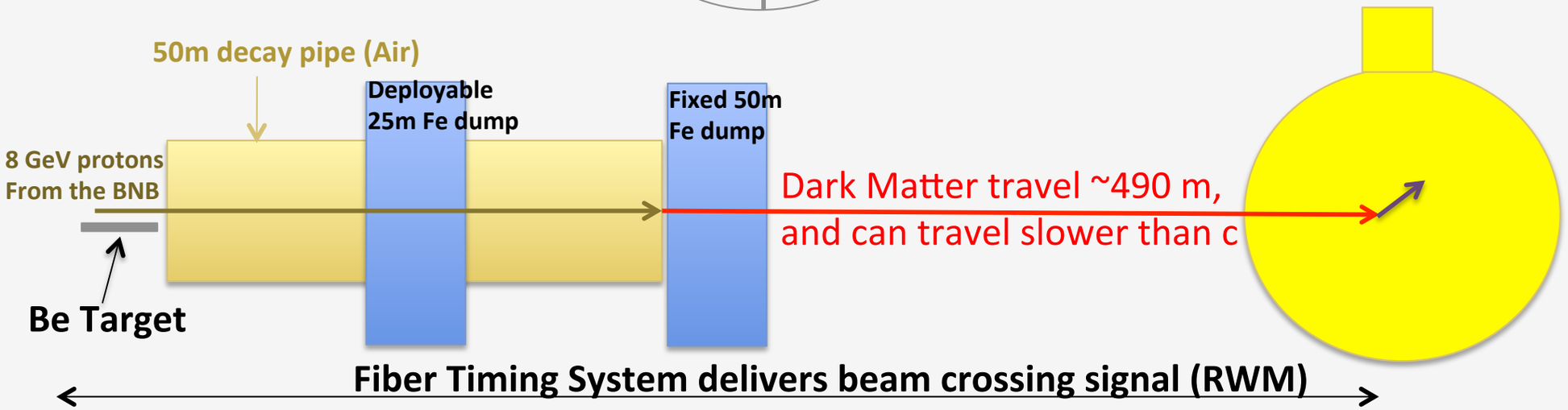
Beam Off Target Running (Beam-Dump Mode)

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).