

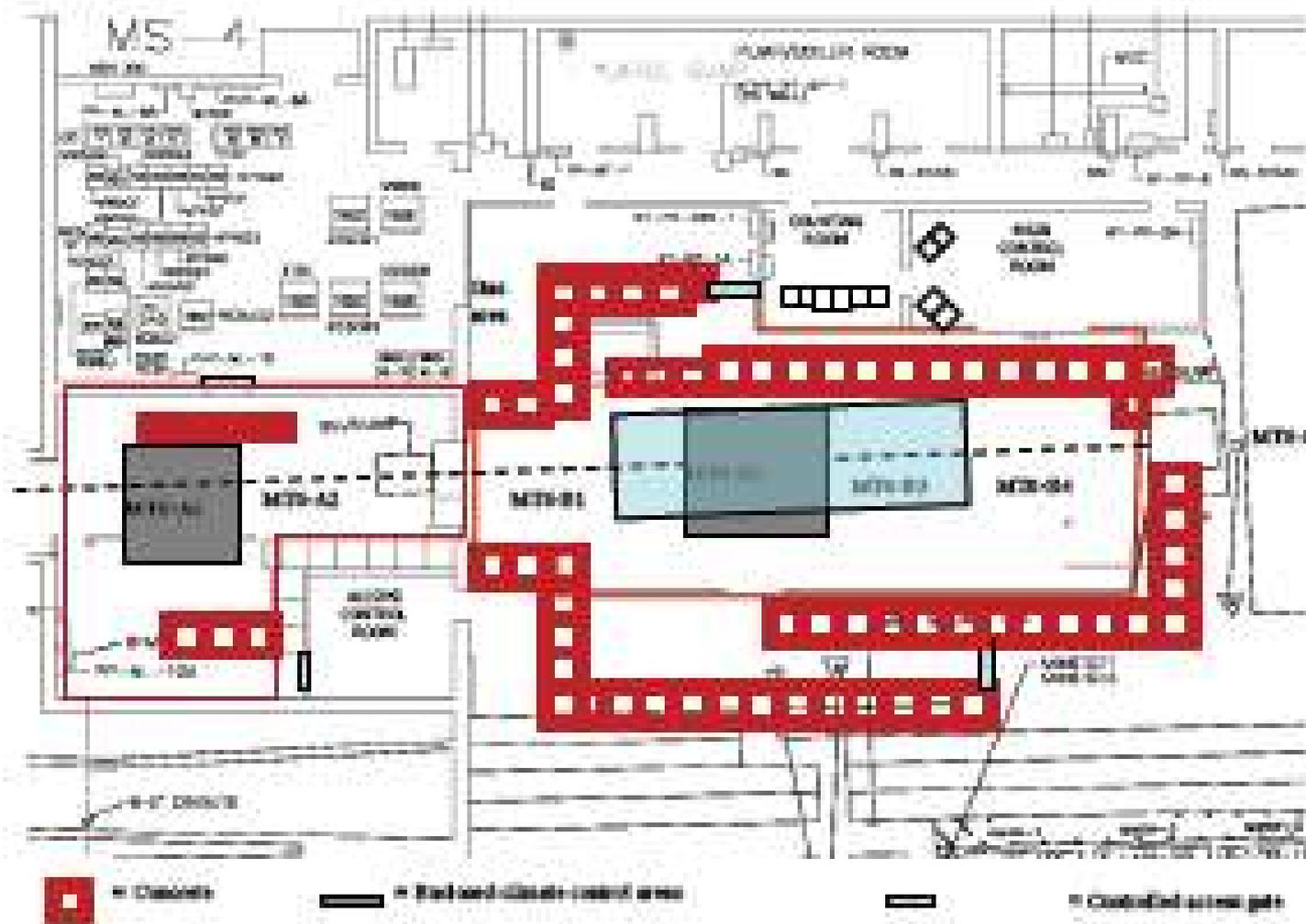
# **NO $\nu$ A & The TEST BEAM**

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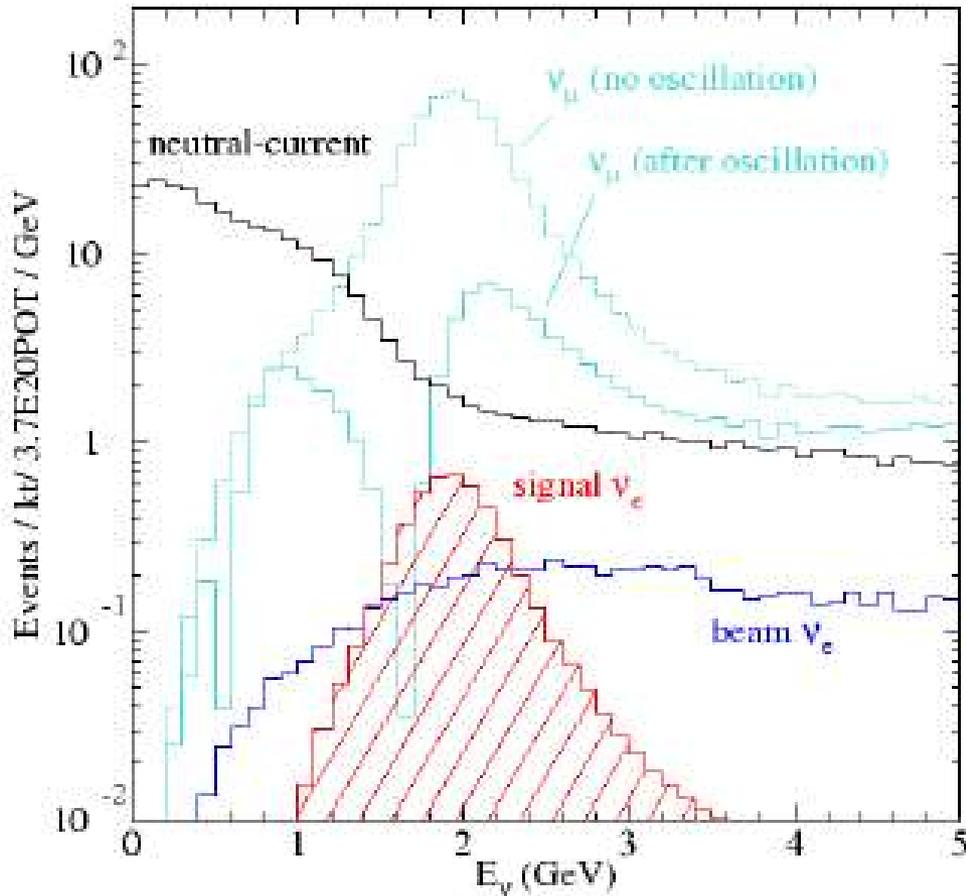
***FERMILAB***

# NOVA NEAR DETECTOR IN THE TEST BEAM

MT6 Test Beam User Area



# NO $\nu$ A SIMULATED ENERGY DISTRIBUTION



$$\Delta m_{32}^2 = 2.5 \times 10^{-3} \text{ eV}^2$$

$$\text{Sin}^2(2\theta_{23}) = 1.0$$

$$\text{Sin}^2(2\theta_{13}) = 0.04$$

FD @810 Km

12 Km Off-Axis

# WHAT $\text{NO}\nu\text{A}$ NEEDS?

1.  $\text{NO}\nu\text{A}$  Far Detector will be  $\sim 12\text{-}14$  mrad ( $12\text{-}15\text{Km}$ ) off-axis.
2. The tail of the ME NuMI beam for off-axis extends to 5 GeV and beyond.
3. Background from beam  $\nu_e$ , NC feed-down etc. need to be studied.
4. Initially a small section of the  $\text{NO}\nu\text{A}$  near detector (ND) can be used to in the test beam. But it is possible that the entire ND could be put in the test beam.
5.  $\text{NO}\nu\text{A}$  ND will be made up of PVC extrusions, liquid scintillator with WLS Fiber and read out with APD's.
6. Oscillated  $\nu_e$  signal will be in the neutrino energy range of  $\sim 0.7 - 3$  GeV, but the background neutrino events extends in energy upto 5 GeV or more.
7. Electrons, pions, kaons, with momentum  $p > 500$  MeV to  $\sim 4\text{-}5$  GeV is needed to understand the backgrounds. The particle momentum should be known to a few percent, with an integrated particle identification system.
8. Muons catcher will also be needed.
9. Time Frame for test beam - 2008 – 2009 and beyond.
10. Rate – not yet defined. But proposed MTEST rate should be sufficient.