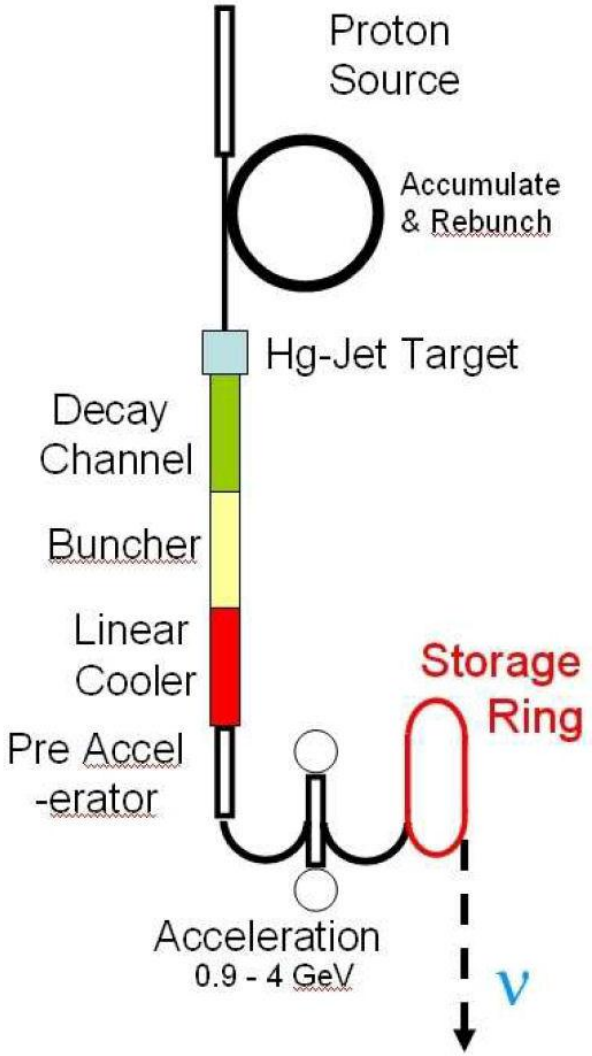


Low Energy Neutrino Factory

EXAMPLE:

L = 1300 km

E = 5 GeV

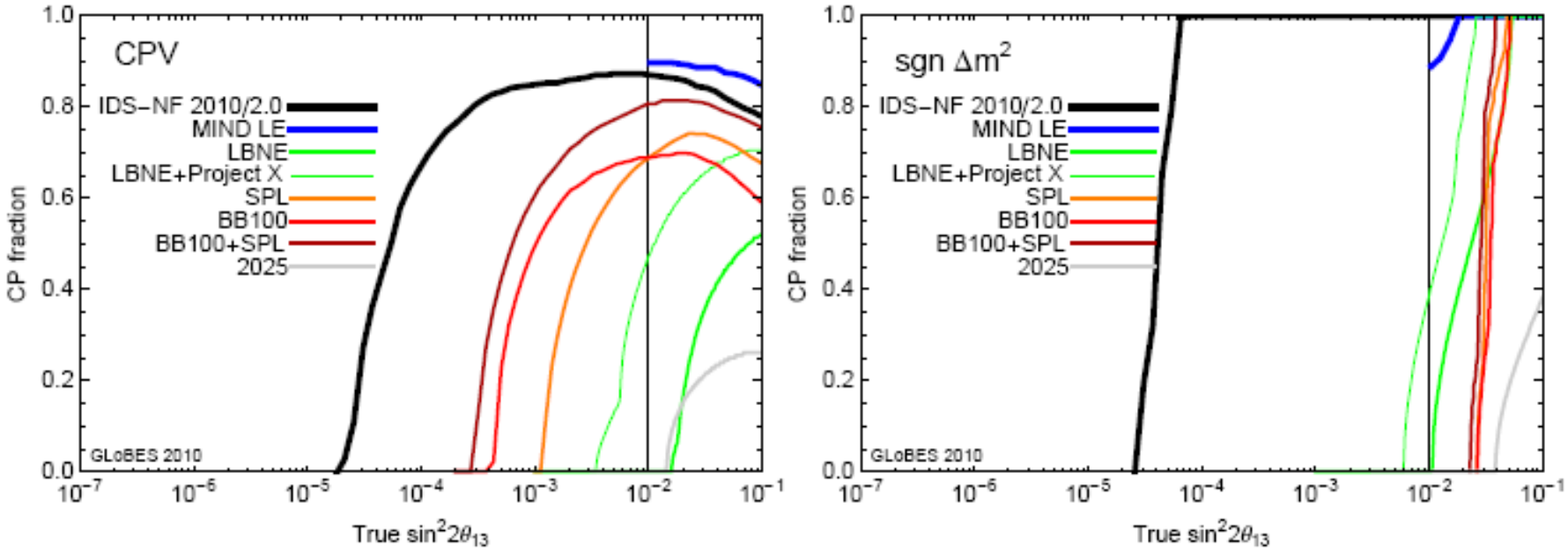
M_{det} = 25kT

10 years run

5×10^{21} muon decays/yr

NF has high sensitivity for large θ_{13}

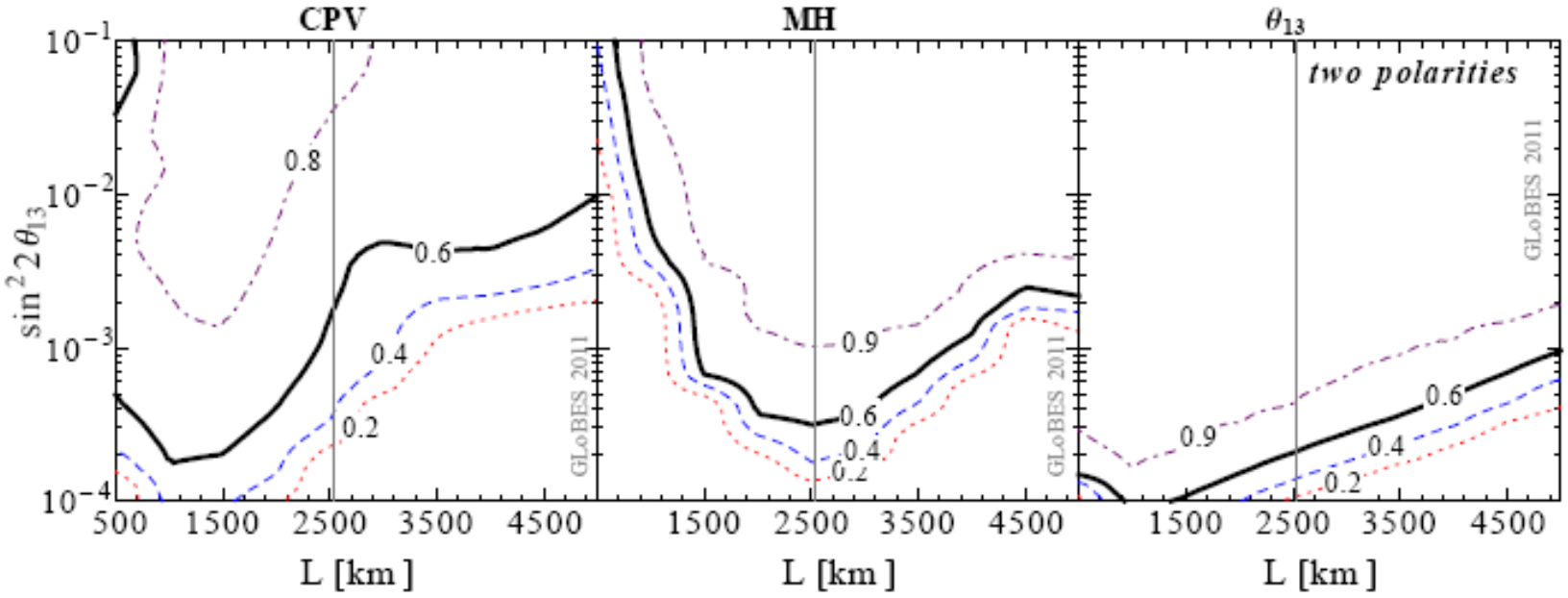
NF-IDS Status Report (May 2011): 3σ discovery reaches



NOTE: For large θ_{13} the LENF comfortably determines mass hierarchy for all CP phases … so the (energy,baseline) optimization can be based just on CPV coverage.

Energy & Baseline

Kumar, Huber, Tang & Winter: arXiv:1012.1872



With 5 GeV NF, can discover CPV for 80% of all possible CP phases … with a broad range of choices for baseline (e.g. 1000 – 2000 km).

Questions

What do we do about the various O(2σ) effects we presently have in neutrino physics?

MiniBooNE neutrino vs antineutrino
MINOS neutrino vs antineutrino
Low Q^2 behavior
Reactor flux normalization uncertainty.

What experimental program is needed to put these effects to rest (or make a stunning discovery)?

Does a low energy muon storage ring (not necessarily a NF) have a role to play in the immediate future, to hammer down the uncertainties?