



Current Events

NOvA Collaboration Meeting

Fermilab

11 March 2006

Gary Feldman



NuSAG Report

- **NuSAG reported to HEPAP last week and endorsed NOvA:**
 - **“The NOvA experiment would give the U.S. a leading role in the program of neutrino oscillations. It is a natural extension of the existing NuMI program at Fermilab and provides a pathway towards more ambitious experiments in the future.”**



NuSAG Report

- **“There are scenarios that would delay or skip NOvA, waiting for ILC siting and approval to be resolved. Though such an approach would save money in the short term and might have more information on $\sin^2 2\theta_{13}$ prior to further investment, it would cede leadership of the field to Japan and direct U.S. physicists to pursue their interest elsewhere. If the time came to revive the program in the U.S., the buy-in cost in an era where megawatt beams would be a prerequisite would be multiplied by a large factor. Further, there would be years with no U.S.-accelerator-based high energy physics, including the time between a decision to return to accelerator-based neutrino physics and the approval of any construction project. The U.S. infrastructure of accelerators and accelerator expertise would degrade during this period, and it is not clear when, where, or by whom a competitive U.S. accelerator neutrino program would develop. “**



New NuSAG Charge

- **“...address the APS Study’s recommendation for a next-generation neutrino beam and detector configurations. Assuming a megawatt class proton accelerator as a neutrino source, please answer the following questions...including those needed for a multi-phase off-axis program and a very-long-baseline broad-band program.”**
- **The charge calls for a preliminary draft report by June 2006 and a final report by August 2006.**



BNL-Fermilab Workshop on Long Baseline Experiments

- **History:** BNL physicists realized that they were not going to get a MW proton source at BNL. So they agreed to work with Fermilab, but still are interested in a long-baseline wide-band approach.
- **The cost of bringing them to Fermilab was this workshop, co-chaired by Dawson and Montgomery. It will evaluate both off-axis and wide-band approaches. First meeting last Monday and Tuesday**
- **This coincides with the new NuSAG charge, and the thought is that NuSAG will wait for this workshop to report.**



Note

- **Unlike Sara Lee, not everyone loves NOvA.**
- **Some see it as preventing the wide-band approach.**
- **Others see it as too expensive for the physics reach.**
- **We have to make a strong case to P5 on April 18 at Fermilab.**
 - **Need a clear Fermilab party line on the proton plan. (Alberto's talk today)**
 - **It would be useful to demonstrate a higher FoM.**



DoE Project Reviews

- **Director's (Temple) CD-1 review 11 days ago. It went well. (J. Cooper's talk)**
- **Real (Lehman) CD-1 review in three weeks. It is essential that we do well in this one.**
- **Cost Estimates**
 - **March 2005 proposal: 165M FY04\$ without R&D**
 - **July 2005 preliminary Director's review: 196M FY05\$**
 - **March 206 Director's review: 249M FY06\$**
 - **Increases from**
 - **Changes in design**
 - **More mature estimates**
 - **Cost of oil**

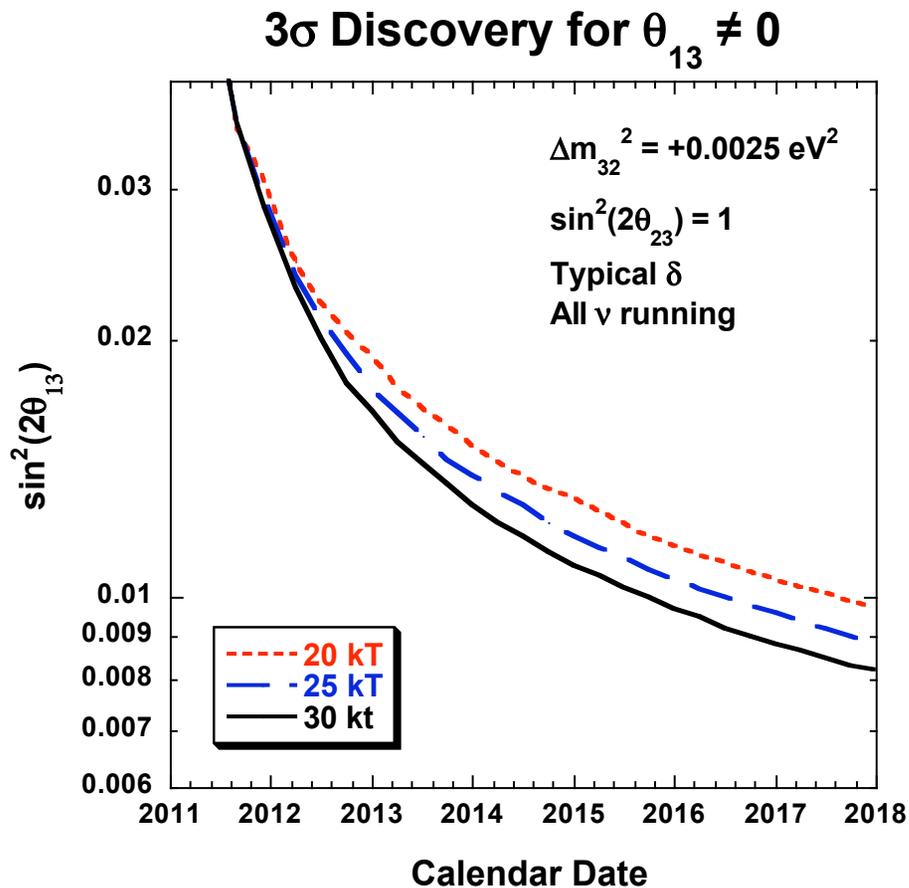


How do we handle the increased costs?

- **Options**
 - Hang tough
 - **Descope (25kT in 6 yrs vs. 30kT in 5 yrs?)**
 - Work towards higher proton intensity and higher FoM.
 - Use earned contingency to increase the mass.
- **High level discussions are in progress with DoE**



20, 25, and 30 kT



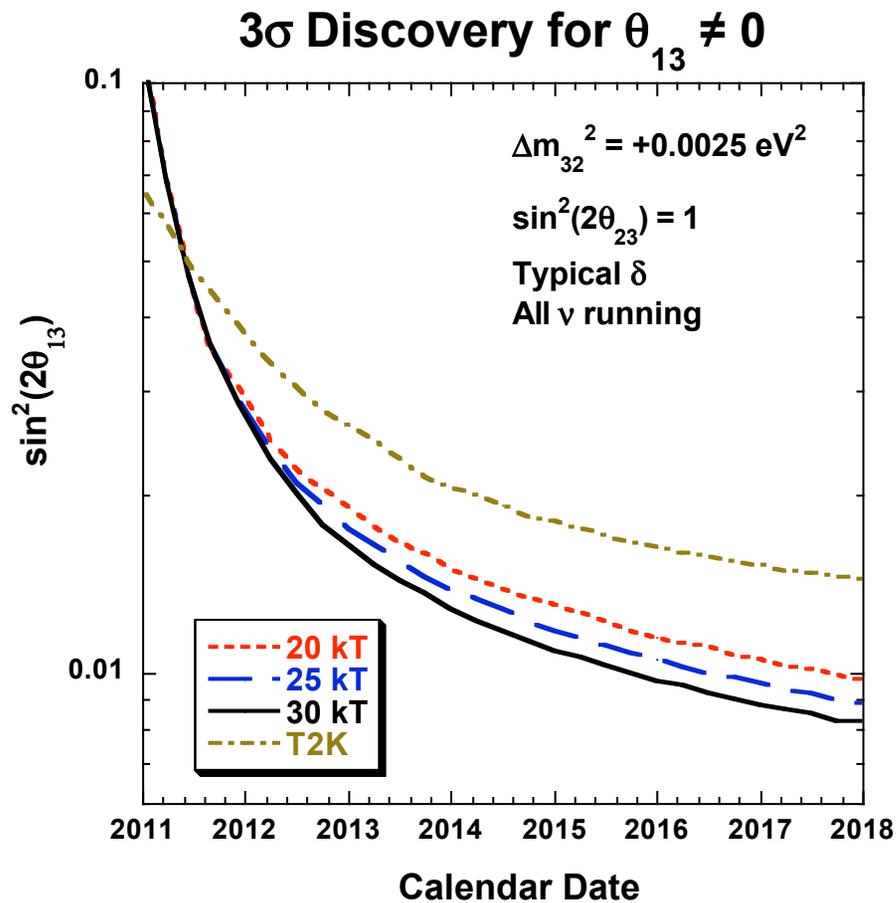
Note:

This has been constructed to be favorable to NO ν A:

Normal mass ordering and all ν running.



Comparison to T2K



Assumes present proton plan for T2K.

The T2K collaboration is pushing for higher intensities earlier.

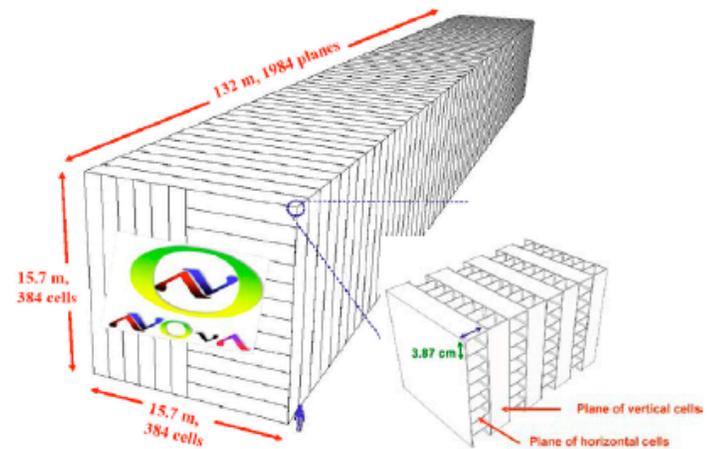
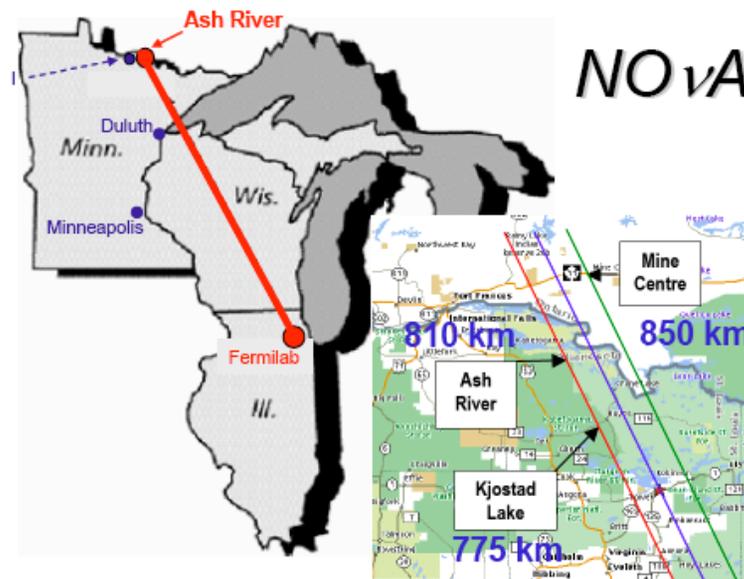


Nakaya Talk

Feb 2006

Severe International Competition!

- **FNAL NO_vA** (**N**uMI **O**ff-Axis **v_e** **A**ppearance)
 - Rival in the discovery of ν_e appearance (θ_{13}).
 - Complementary in Phase-II
 - T2K: CPV effect
 - NO_vA: CPV + Matter effects
- Reactor θ_{13} experiments
 - Complementary?

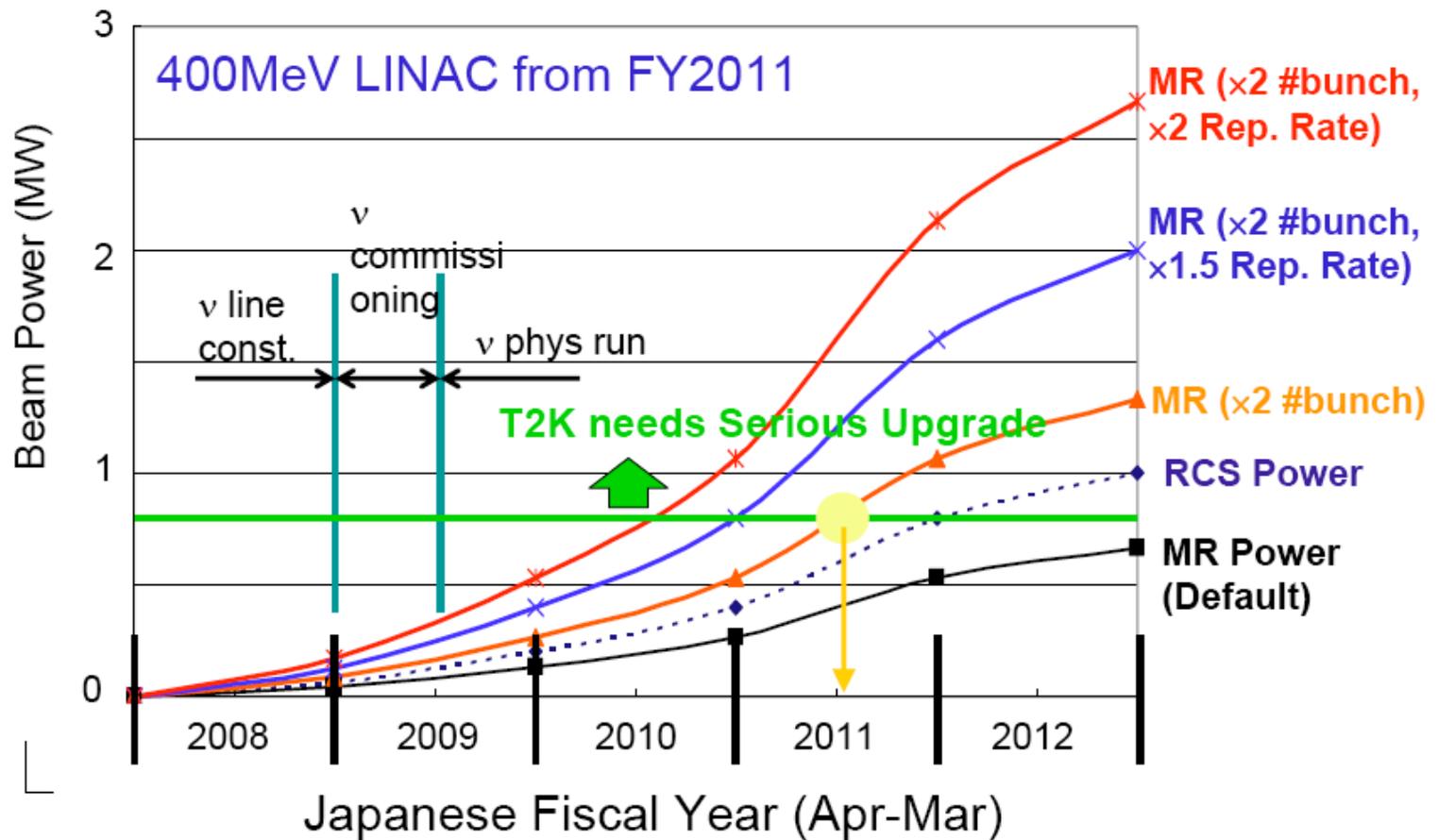


A 30kton full active far detector will be completed in 2011



Nakaya Talk Feb 2006

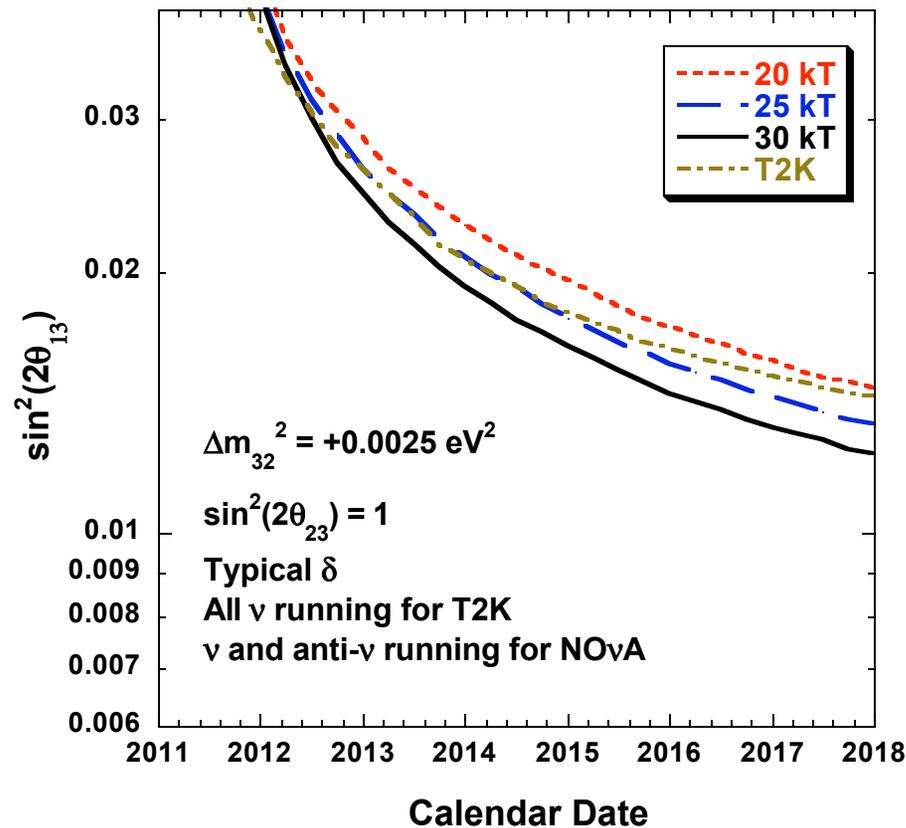
Beam power upgrade plan





NOvA ν and Anti- ν Running

3σ Discovery for $\theta_{13} \neq 0$



Equal amounts of ν
And anti- ν running.

This is our preferred
mode because it
provides more uniform
sensitivity and infor-
mation on mass
ordering and the CP
phase.