

## Responses to questions

October 26, 2006

For Liquid Argon:

13. NuSAG recommends that the Liquid Argon group reweight its emphasis from sensitivity/reconstruction/pattern recognition to hardware issues and cost estimates. We realize that a full switch cannot occur if the LAr group is a big part of the more generic off-axis calculations in the Working Group, but, for example, LAr-specific reconstruction and particle ID algorithms seem less pressing than technical feasibility.

14. What has actually been measured on purity of the Ar in a tank made with industrial technology? If not yet tried, when will the first tests be?

Response: No tests have yet been performed on purity of Argon in a tank made with the industrial technology necessary for construction of a massive detector. This test will require a large tank,  $\sim 1$  kton, constructed using the same techniques as a large detector. This project has been envisaged by the LArTPC group as outlined in their report to NuSAG in 2005. A specific plan for this component of the R&D path is presently under study and expected to converge within a year. In the meantime, small scale tests using the Materials Test Stand at Fermilab (see writeup for details) will have first results addressing purity issues within this year.

15. When do you expect to have tried 3-m drifts and long wires in the US? What effect will the capacitance of very long wires have on electronic noise?

Response: A program to study 5m drifts using a prototype vessel at Fermilab is in the design stages. Depending on funding, results from this project are expected within the next two years. As well, long drift tests are underway in Europe on the same timescale.

A 30m long wire with 4 meters of interconnecting cable to electronics will have a capacitance of 620pF [?]. Using commercial amplifiers, a signal to

noise of  $\sim 9$  can be achieved, adequate for LArTPCs. Another configuration that has been considered is to use cold electronics, eliminating the interconnecting cable. This option is under study at Michigan State University in Carl Bromberg's group.

16. What are the R&D milestones, with an estimated schedule, that would lead to a first realistic cost estimate for a detector of the 2nd-off-axis or wide-band class?

Response: Please see short document describing LAr R&D program.