

## LArDBT Meeting 4/9/1

Bonnie, Mitch, Kirby, Brian, Alan, Andrzej, Eric, David, Flavio, Ornella, Jeff Nelson, Mike Kordosky, Je

### Phase 1 NSF Proposa

Bonnie talked to John Kotcher. Said proposal was well suited to the program. \$10M total available in first year, will only fund first year. Will submit 3 year grant for postdoc and student between Yale and Syracuse. Mitch and Bonnie have talked about format for grant

Equipment should be very separate from funding for people. People are currently the largest portion of the cost

Bonnie and Jen are working on text for some parts of the proposal (Bonnie: Intro, Budget and Project Summary, Jen: ArgoNeuT modifications, FTBF). Brian is working on statement about Phase 2, trying to strike a balance between saying that Phase 2 exists and not making it sound so excellent that NSF would ask why we don't just do phase 2 alone. Bonnie is going to work on getting the introduction first to provide a flow for the document. Andrzej suggested that we could advertise Phase 1 as helping to understand the beam in order to be able to develop Phase 2. Dave also stated that an important component of Phase 1 is learning about the beam itself; identifying and measuring it

Dave brought up concern about whether beam can provide low enough intensity to prevent pile up issues. Flavio mentioned that the light collection in the TPC should help with that. Alan and Brian pointed out that with SEAQUEST running it should be easier to shave off small amounts of beam to go to MCenter. Jeff described the MINERvA experience - pointed out that there was a lot of particles and fuzz around the muons. Apparently a lot of splash events too. Time of flight caused some accidental vetos. Beam line provides an angular range of particles - just a spray of particles, not momentum selected

Flavio suggested for the next meeting to have MINERvA folks describe their experiences with the tertiary beam

Alan suggested coming up with requirements for the beam itself so that the beam people can really understand what we need -- they're not used to dealing with detectors with such large deadtime

Should try to work with NOvA to define the beam

Bonnie talked to Karol, and he mentioned the NOvA test beam effort and that the proposals should mention each other

Draft needs to be ready for Yale 24th April, draft should be done by the end of this week

Flavio asked about how to estimate the cost of modifying ArgoNeuT hardware. Mitch has some existing estimates from SciBooNE that will be helpful here. Bonnie will talk to Larry Bartoszek about putting some of his time into the proposal, and she also has requested information from Craig Thorn about the cost of piggybacking on the MicroBooNE cold electronics order

Andrzej suggests reusing the scintillator paddles from ArgoNeuT. Those paddles are being used by MINOS as they were owned by Texas. W&M group will cost building scintillator planes. Mike suggested using SiPMs

Action items:

1. Get costings for various hardware upgrades  
2. Write the draft

Phase

Relevant parameters for liquid

argon:[http://pdg.lbl.gov/2011/AtomicNuclearProperties/HTML\\_PAGES/289.htm](http://pdg.lbl.gov/2011/AtomicNuclearProperties/HTML_PAGES/289.htm)

Alan says shower containment is key.

Mike says the hadronic showers determine the scale. Mike has containment curves from MINOS caldet which was 1 m x 1 m x 3 m

Flavio points out at these energies hadronic showers are more like single particles

Andrzej is looking at ArgoNeuT with simulation

Detector size: 1 m diameter scale seems to be reasonable for transverse direction

Jeff mentioned that neutron halo impacts calorimetric performance metric. Jeff says that longitudinal containment is probably most important

Flavio points out the neutron interaction length is around 70 cm, so 1 meter size will not get all the neutrons, but increasing beyond that will not necessarily make things much better

Dave suggests getting Rik Gran to present on the tertiary beam

**Action items:**

- 1. Mike was going to find plots of hadronic shower in terms of radiation.**
- 2. Andrzej was going to work on simulating hadrons in MicroBooNE to understand containment issues.**