SHORT-BASELINE FOCUS GROUP MEETING

1 May 2012

INTRODUCTORY REMARKS

- Interim report sent to Pier & YKK on 24 April.
  - Thanks to all who contributed !
  - Good first step towards final report.

- Final report due May 31st
  - 4 Weeks from now.
  - Probably will still be a “draft”

- In the Interim Report we defined a set of limited things we wanted to accomplish for the final report.
  - Next 2 weeks are critical for getting those things accomplished.
  - Need to start absorbing new information into a draft report as soon as possible.

ACTION ITEMS

(based mostly on what we said in the Interim Report)

- Tensions Group
  - Summarize input on expectations for near-term experiments.
  - Decision Tree
  - P vs L/E for all relevant options ? P vs E for all relevant options ?
- Options Group.
  - More complete description of options relevant to a future FNAL program.
  - Explore more LSND follow-on at FNAL in PX phase 1 era.
  - How precisely can nu-mu disappearance be measured? Good enough ?
  - Formulate recommendations for developing options.
- Options + Cross-Sections/Fluxes Groups
  - "Proposal vs Actual" archeology. Complete & summarize in a table.
- Cross-Sections & Fluxes Group
  - Complete summary in a table (or plot ?) the likely status in the near future for relevant processes, and additional measurements desired.
- Facilities Group
  - More comprehensive & neutrino-centric table(s)
- ALL
  - Formulate recommendations

OPTIONS

Accelerators: Decay at Rest		
OscSNS	Off-axis, ORNL or FNAL	●
LSND Reloaded	Super-K with Gd & cyclotron	
IsoDAR	60 MeV cyclotron, ^{12}B &/or ^{8}Li decay at KamLAND	
RICOCHET - DAR	Coherent scattering with bolometers	●
Accelerators: Decay in Flight		
BooNE	Two detectors	●
MicroBooNE + LAr	Two LAr TPC's (LArLAr)	●
NOvA Short-Baseline	1-2 km off-axis detector(s), also SciNOvA	●
Nu-tau appearance	With L/E ~ 1 m/MeV	●
Muon Storage Ring	pions captured within the ring, then decay to muons which remain captured in the ring	●
Entry-Level Neutrino Factory	Higher intensity than muon storage ring	●
Neutrino Factory	Full "International Design Study for a NF" Design	●

Table 4 in Interim Report

The accelerator-based options are the ones of potential relevance to the future FNAL program.

Need an expanded summary of the proposals and what the proponents claim are the capabilities.

Are there any actions the lab management could/should take to further the development of these options ?

DECISION TREE

	2012-2013	***2013-2014***	***2014-2017***
Appearance	MiniBooNE $\bar{\nu}_e$ (x2 more data)	ICARUS ν_e	MicroBooNE ν_e
	MiniBooNE ν_e, $\bar{\nu}_e$ combination	T2K near detector ν_e	NOvA near detector ν_e, $\bar{\nu}_e$
Disappearance	MiniBooNE/SciBooNE joint $\bar{\nu}$	IceCube ν and $\bar{\nu}$	MicroBooNE ν MINOS+ ν
Other	reactor flux calculations reactor $\bar{\nu}_e$ disappearance	radioactive source experiments	
		Planck results	

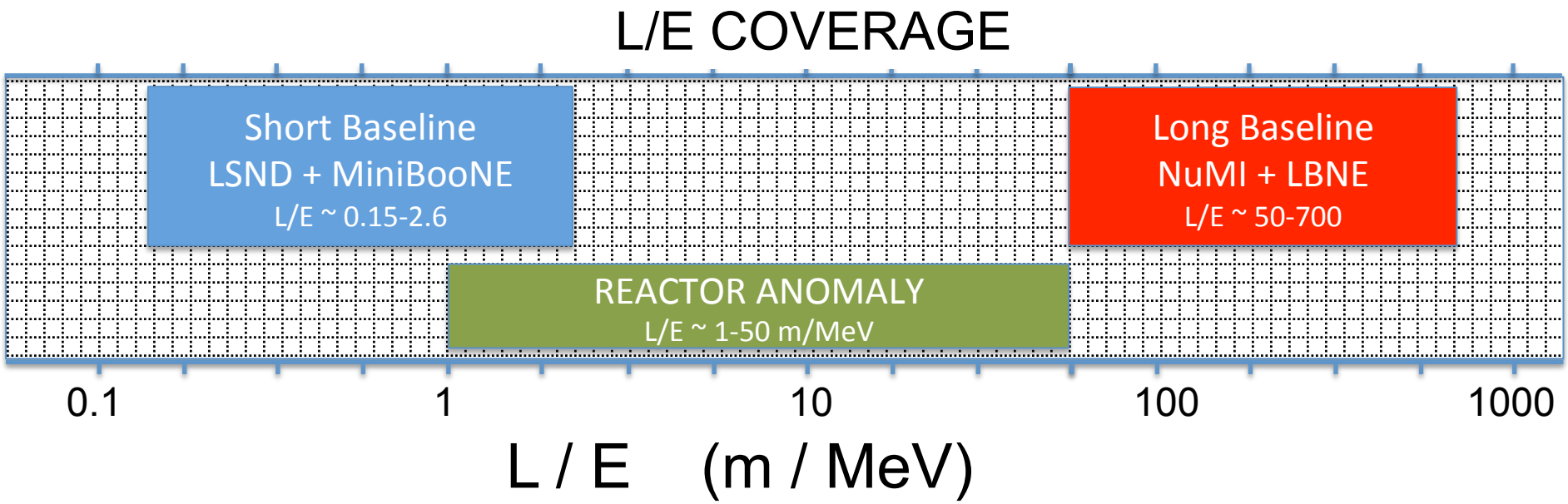
Table 1: List of expected measurements from on-going and near-term approved experiments

How might results from these experiments affect the desired accelerator-based short-baseline program ?

EXAMPLE "WHAT IF?"

	E (MeV)	L (m)	L/E (m/MeV)
LSND	20-200	30 +- 4	0.15-1.5
MiniBooNE	200-1500	510+-31	0.3-2.6
NuMI LE	1,000-6,000	735,000	123-735
NuME ME	2,000-10,000	735,000	74-368
NuME HE	5,000-15,000	735,000	49-147
NOvA LE	1,500-2,500	810,000	324-540
LBNE	2,000-5,000	1300,000	260-650

If the Reactor Anomaly becomes more convinc-ing and/or if Planck results make Neff > 3 more solid, do we need to fill the accelerator-based L/E hole ?



ANOTHER EXAMPLE

- If ν_e and/or anti-ν_e disappearance is established by source/reactor experiments at the O(1%) level, then a ν_μ disappearance measurement at this level becomes "mandatory" if it can be done (?)

- If ν_e and/or anti-ν_e disappearance is excluded at the O (1%) level, then a ν_μ disappearance measurement at a similar level would constrain LSND-like $\nu_\mu \rightarrow \nu_e$ transitions. Hence, if we believe the ν_e/anti-ν_e searches will achieve the required sensitivity, there would appear to be a good case for a 1% ν_μ disappearance search.

- How robust is this argument ? Is 1% good enough ? Can future results from the near-term experiments modify the required precision, relaxing it or making it even harder ?

FINAL REMARKS

- Based on group presentations + discussion today, will update the action list.
- Will also discuss with YKK / Pier to try to maximize the utility of what we produce.
- Although there is not much time, if we focus on a limited set of achievable action items, I think we can piece together something that should be helpful to Lab management in their strategic planning.