

Development of a detector calibration program for LBNE
v1.0

- I) Simulations studies (*all institutions within same framework but each with different focus*)
- potential to improve institutional computing infrastructure
 - a. simulation of LBNE performance (e.g. physics sensitivities) as function of neutrino parameter uncertainties
 - b. verification of principal detector uncertainties affecting neutrino parameter measurements and hence LBNE sensitivity
(approximate list known from past experience where applicable)
 - i. in far detector
 - 1. Water Cherenkov technology
 - 2. liquid Argon technology
 - ii. for near detector
 - 1. scintillator/water target option
 - 2. Argon component
 - c. Quantitative determination of calibration requirements for most significant (detector) parameters
- II) Test setups and device prototyping (*institutions have individual tasks, some are more closely linked than others but all are still correlated through part I) and ultimately part III)*)
- a. Development of test-setups and prototype measurements systems to demonstrate suitability of technique to measure relevant parameters
(Build up of infrastructure and expertise (i&e) at local EPSCoR institutions to perform calibration tasks and analysis for LBNE and other future HEP experiments.)
 - i. in far detector
 - 1. WCh
 - a. energy calibration
 - b. optics calibration } →institutional i&e
 - c. particle/interaction ID
 - 2. LAr
 - a. energy calibration
 - b. particle/interaction ID } →institutional i&e
 - c. cryogenics parameters
 - ii. for near detector
 - 1. water/scintillator technology
 - a. energy calibration
 - b. particle/interaction ID } →institutional i&e
 - c. ...
 - 2. Ar technology
 - a. energy calibration
 - b. particle/interaction ID } →institutional i&e
 - c. ...

- III) Analysis and comparison of prototype data and MC to optimize physics reach of LBNE thanks to calibrations (*institutions merge work of I) and II) into final and global calibration program for LBNE; work happens partly in parallel with items I) and II))*)
- a. (re-)establish prioritized list of physics and detector parameters to be measured/calibrated
 - b. identify optimal suite of calibration tasks, calibration technology and proven devices
 - c. deliverable → significant part of calibration program for LBNE (detectors)

distribution of interests:

<u>WCh far detector</u>	<u>LAr far detector</u>	<u>Near detector</u>	<u>Simulation only</u>
LSU	Kansas State (?)	South Carolina	Alabama (?)
Iowa State			
SDSMT			
Hawaii			
SD State			

(should be weighted by faculty or FTE)