

Physics Topics for Test Beam

LAr

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LArDBT meeting (5/30/12)

- Calorimetry
 - EM Showering--energy resolutions
 - Hadronic Showers and ratio of $E_{\text{had}}/E_{\text{em}}$
 - visible vs invisible energy
 - Energy deposit corrections vs track location (relative to drift direction)
- Tracking
 - Directionality of through-going particles
 - Using delta rays.
 - Relevant to up-going vs down-going muons
 - demonstrated by Icarus ~ 2 delta/m
 - Particle ID (e vs gamma)
 - dE/dx vs particle
- 6) Efficiency of Light Collection
- Other Misc.
 - 1) Operation on surface with cosmic rate. (worries about space charge.....)

Incident Beam particles

- e, μ, π^\pm, p (F.Cavanna)
 - Energy ranges consistent with ν produced events using FNAL beams (NUMI, Booster)
 - $\sim 0.1-10$ GeV depending on particle type
- Make a K_L beam to study backgrounds for $p \rightarrow K^+ + \text{lepton}$ channel (F.DeJongh)

Other Considerations

- Flavio points out that we are on the low energy side for the concept of showers.
 - In other words, there are large fluctuations and simple parameterizations may not be sufficient in calculating “containment”.
 - Also does one do “calorimetry” (just sum charge) or do tracking for these showers
- Flavio’s list is more detailed