

Abstract Submitted
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Preliminary Design of the Gas Cherenkov Muon Monitors for LBNE CRAIG PITCHER, University of Colorado at Boulder — I am performing preliminary research for a future neutrino experiment at Fermilab called the Long Baseline Neutrino Experiment (LBNE). More specifically, I am determining the best geometry for the gas Cherenkov muon monitors. The purpose of the monitors is to measure, at least indirectly, the energy spectrum of the muons in the beam. I use computer software to simulate a realistic muon beam going through the monitors. Muons in the particle beam that go through the monitors emit Cherenkov radiation, and this light is detected by PMTs. I then plot the number of photons detected as a function of the muon's energy that emitted the detected photons. My goal is to have a very narrow peak on this plot. This peak shifts depending on the simulated index of refraction. The best design for the monitors is an L-shaped pipe filled with Freon gas of adjustable density. It is the simplest and cheapest to build of all the designs I tried, and it can accurately recover the muon energy spectrum based solely on the total number of photons detected in each pulse: using simulation data from 5 indices of refraction, I can recover the muon energy spectrum (within the uncertainties) of a beam that has 5 discrete muon energies.

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