Contribution ID: **22** Type: **not specified**

JASMIN: Japanese-American Study of Muon Interactions and Neutron detection

Wednesday, June 2, 2010 3:40 PM (20 minutes)

Experimental studies of shielding and radiation effects at Fermi National Accelerator Laboratory (FNAL) have been carried out under collaboration between FNAL and Japan, aiming at benchmarking of simulation codes and study of irradiation effects for upgrade and design of new high-energy accelerator facilities. The purposes of this collaboration are (1) acquisition of shielding data in a proton beam energy domain above 100GeV; (2) further evaluation of predictive accuracy of the PHITS and MARS codes; (3) modification of physics models and data in these codes if needed; (4) establishment of irradiation field for radiation effect tests; and (5) development of a code module for improved description of radiation effects.
A series of experiments has been performed at the Pbar target station and NuMI facility, using irradiation of targets with 120 GeV protons for antiproton and neutrino production, as well as the M-test beam line (M-test) for measuring nuclear data and detector responses. Various nuclear and shielding data have been measured by activation methods with chemical separation techniques as well as by other detectors such as scintillator with a veto counter, phoswich detector and a Bonner ball counter. Analyses with the experimental data are in progress for benchmarking the PHITS and MARS codes. In this presentation recent activities and results will be reviewed.

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Session Classification: Session 3 - Benchmarking code/code & code/experimental data

Track Classification: Benchmarking - code/code and code/experimental data