III.E2. FERMILAB NEUTRINO HYBRID SYSTEM

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The FNHS group at the Workshop consisted of seven co-sponsors of proposal P-647 (R. J. Cence, W. F. Fry, T. Kitagaki, V. Z. Peterson, R. Plano, C. E. Roos, and J. Schneps) plus newly interested members (R. Ammar, C. Matteuzzi, E. Hafner, P. Haridas, N. Kwak, P. K. Malhotra, J. Marfin, D. Potter, and W. Yang). Three short meetings were held during the working sessions, plus an extra "seminar" to hear C. Fisher describe holography in bubble chambers.

The primary goal of the FNHS meetings was to explore new ideas for physics experiments which could be done best with the FNHS. J. Schneps emphasized tests of GIM in neutral currents, such as $\Delta S \neq 0$ and $\Delta C \neq 0$ reactions. FNHS' ability to identify strange particles (charged and neutral) was emphasized. Ability to detect short-lived decays ($> 30\mu$) is important in charm detection. C. E. Roos' and C. Fisher's talks on holography led to the tentative conclusion that holography should be practical for the FNHS chamber.

C. Matteuzzi discussed QCD tests with FNHS using the higher ranges of Q^2 (to 500 GeV^2) and W^2 (to 1200 GeV^2) available in neutrino beams at the Tevatron. Charged-current structure functions belong to the counters, but fragmentation functions can only be done using bubble chambers. Arguments were presented why QCD may be tested more severely via fragmentation functions. Neutrino CC interactions select the struck quark and particle identification defines fragmentation products.

U. Sukhatme emphasized the unique opportunity of FNHS to study **diquark** fragmentation, particularly the jet structure resulting from "color confinement" of the diquark.

Neutral current studies, particularly from H_2 and D_2 targets, can be carried out particularly well using FNHS. Hung and Sakurai have described sensitive tests of the "standard model," involving $d\sigma/dx$ from both ν and $\bar{\nu}$ on protons and neutrons. The FNHS' complete final state reconstruction permits, in principle, evaluation of E_ν, x, and y in a wide-band beam.

Detector characteristics were reviewed and several design changes were discussed. R. J. Cence described Monte Carlo results on reconstruction of multi-pizero final states. Neutral strange particle detection is enhanced by good π^0 detection. This should make possible detection of additional heavy quark decay modes.