Study of CHARM physics in neutrino scattering

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The CHORUS detector was exposed to the neutrino beam of the CERN SPS during the years 94-97. About $10^6 \nu_\mu$ CC events were collected in the nuclear emulsion target. Up to now, about 200,000 ν_μ events have been located and analysed.

With the present performance of emulsion scanning systems, it has become possible to perform large area volume scanning. All tracks belonging to an interaction vertex can be recognised and measured precisely. This technique has been used for the recognition of events where charmed particles are produced. More than 2000 events with a recognised charm decay have been collected and fully measured.

Results obtained from the analysis of the data on the production rate in ν_μ CC interactions of neutral charmed mesons (D^0) and charmed baryons (Λ_c) will be presented. The quasi-elastic production of charmed baryons is measured independently from the DIS contribution. In addition a measurement of the branching ratio into muons of the charmed final state particles in neutrino interactions will be shown. Also new measurements of topological branching ratios of D^0 and Λ_c will be given. In particular, a new inclusive measurement of the D^0 branching ratio into all neutrals has been performed, the result of which will have implications on the interpretation of all previous production data.

Results on the measurement of charm production by anti-neutrinos will be discussed and a comparison with the production by neutrinos will be presented.

New data on associated charm production in neutral-current and charged-current interactions will be shown, where it will be possible for the first time to compare the NC and CC cross-sections. Finally, fragmentation functions, D-star production, and the strange quark x-distribution will be shown.

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