



Contribution ID: 42

Type: not specified

Pion Production in the HARP/PS214 experiment at CERN PS

Final results for the production of charged forward pions in the angular range $0.025 < \theta < 0.250$ rad and in the momentum range $0.5 < p < 8.0$ GeV/c will be presented together with final results for the production at large angles $0.35 < \theta < 2.15$ rad and in the momentum range $100 < p < 800$ MeV/c. Data have been taken with incident protons or pions in the range 1.5-15 GeV/c with thin Be, C, Al, Cu, Sn, Ta, Pb solid targets, with thick (1 interaction length) C, Ta, Pb solid targets (large angle production) and with N₂, O₂ cryogenic targets with the large acceptance HARP experiment at CERN PS. For incident pions the presented data represent the first experimental campaign to systematically measure forward pion hadroproduction. Results have been compared with GEANT4 and MARS MonteCarlo simulations and parametrized (for incident protons) for easy use. The results may be useful for simulation of existing neutrino beamlines, atmospheric neutrinos fluxes, extensive air shower (by reducing the uncertainties of hadronic interaction models in the low energy range), for the tuning of available QCD inspired Monte Carlo simulations and for simulation of future Neutrino Factory beamlines.

Summary

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