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(π^- , ^{12}C) BACKWARD ELASTIC SCATTERING CROSS SECTIONS

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ON THE ENERGY DEPENDENCE OF (π^\pm , ^4He) AND (π^- , ^{12}C) BACKWARD ELASTIC SCATTERING CROSS SECTIONS

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We have measured the large angle elastic scattering cross section for the reaction (π^- , ^{12}C), in the energy range 60 - 90 MeV (1), at 30 MeV for the reaction (π^+ , ^4He) and at 70 MeV for the reaction (π^- , ^4He), using a 180 streamer chamber magnetic spectrometer (2), exposed to the beams of Frascati Laboratory. In Fig. 1 the experimental data for (π^- , ^{12}C) backward elastic scattering cross section are compared with the optical model predictions, using Mach potential (3). This potential differs from the originally proposed gradient potential of Kisslinger (4) containing an additional term proportional to the Laplacian of nuclear density. This term, obtained taking into account the Fermi motion of target nucleons, because of its surface-peaked nature, mainly affects the large angle scattering. The experimental data show a maximum value at about 75 MeV, while the theoretical prediction is at about 85 MeV. In both cases it results shifted respect to the maximum value (at about 140 MeV) of the total elastic scattering cross section (5).

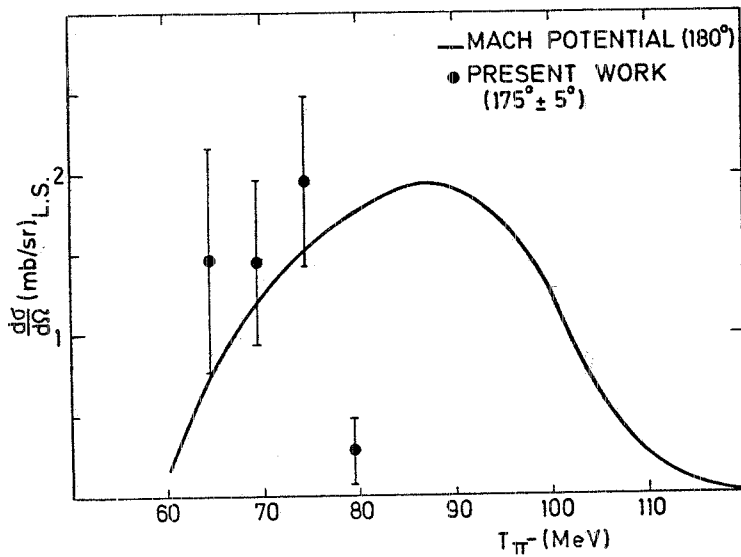


Fig. 1

Fig. 2 shows the comparison between the existing experimental data (6) of (π^\pm , ^4He) large angle ($> 160^\circ$) differential elastic scattering cross section and the optical model predictions, using Mach and Laplacian potentials, as made by Dubna-Torino collaboration (7) for the (π^\pm , ^4He) elastic scattering experiment. As for (π^- , ^{12}C) scattering the maximum value of (π^\pm , ^4He) backward elastic scattering cross section is shifted respect to the maximum value of the total elastic scattering cross section (at about 150 MeV). These preliminary re-

sults show that the study of backward scattering at low pion energy, as also pointed out by Hüfner (8), can certainly give more informations about pion-nucleus scattering.

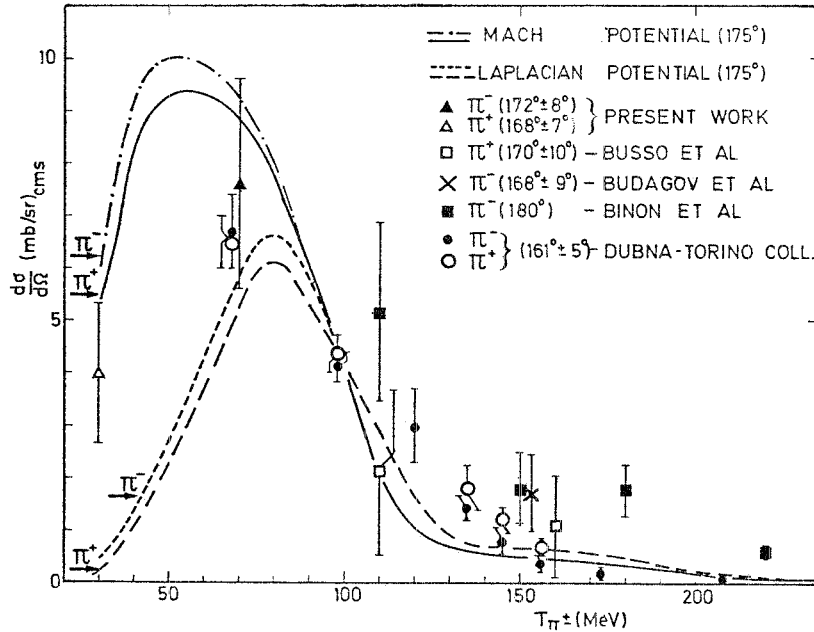


Fig.2

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