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THE $^{2}H,^{16}O(\pi^{+},\pi^{+}\pi^{-})$ REACTION AT $T_{\pi^{+}}$ = 280 MeV

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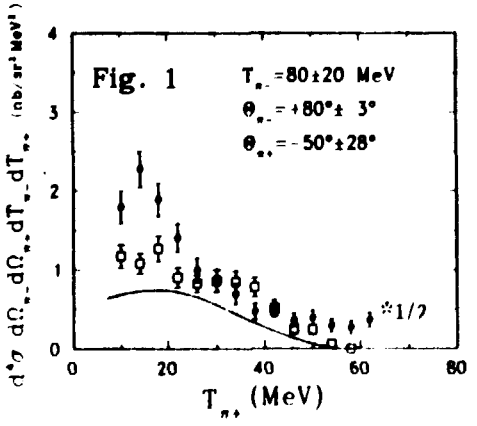
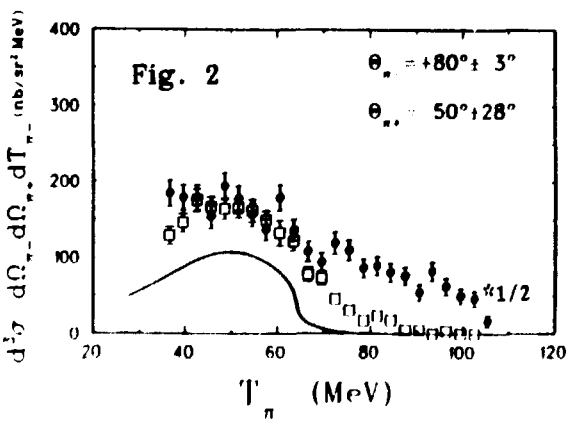
The reaction of pion induced pion production, $A(\pi,\pi\pi)$, on ^{2}H, ^{16}O and ^{208}Pb, at $T_{\pi^{+}}$ = 280 MeV was studied at TRIUMF on the high intensity pion channel, M11. Some results, displaying interesting features of the $^{2}H,^{16}O(\pi^{+},\pi^{+}\pi^{-})$ reaction channel, are presented; while for the ^{208}Pb nucleus data are presently being analyzed. Experimental results are compared with a model for the $A(\pi,\pi\pi)$ reaction[1]) in the case of ^{16}O target[2]), and with a model for the $\pi^{+}d \rightarrow \pi^{+}\pi^{-}pp$ reaction for the deuterium[3]).

The scattered positive pions and the produced negative pions were detected in coincidence with a total absorption range telescope counter and with a QQD spectrometer respectively. For (π^{+},π^{-}) pairs, kinetic energies (E) and coplanar angles (ϑ) were measured such as to cover a large portion (>80%) of the E-ϑ phase space. Data were reduced in form of 3- and 4-differential cross-sections and compared with the predictions of the models quoted in ref.s 1 and 3, however, experimental data and theoretical calculation were integrated over the same portion of the E-ϑ phase space.

As far as the total cross section, σ_{T}, is concerned, preliminary results yield $\sigma_{T}(^{2}H) \lesssim 450$ ub, a value close to $\sigma_{T}(^{1}H)$=384 ub[4]); moreover, $\sigma_{T}(^{1}H)$ and $\sigma_{T}(^{2}H)$ have nearly the same size at intermediate energy pions[5]). The experimental $\sigma_{T}(^{2}H)$ is about 5 times smaller than the σ_{T} for oxygen, 2250±350 ub[2]), the latter agrees (within the error bars) with the value predicted by the model of ref. 1, 2650 ub. The comparison between theoretical and experimental data indicates that the final size of the σ_{T} (^{16}O) is determined by a proper renormalization of the pion lines in the nuclear medium, which produces a factor 2.5 increment.

Measured many-fold differential cross sections are presented in fig.s 1 and 2. The full circles and the open squares are oxygen and deuterium data, respectively. The continuous line represents the predictions of the model of ref.3 for the $\pi^{+}d \rightarrow \pi^{+}\pi^{-}pp$ reaction. Indeed, they are preliminary results since, originally, the model was developed for the $\pi^{-}p \rightarrow \pi^{+}\pi^{-}n$ reaction. The calculation reproduces the shape of our data satisfactorily, while it predicts about an intensity 30% lower. This discrepancy should decrease when considering the contributions of intermediate N^{*} to the pion production through the $N^{*} \rightarrow N\pi\pi$ decay channel[3]).





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