

STUDIES ON η MESON PRODUCTION IN DP COLLISIONS AT THE MAGNETIC SPECTROMETER ANKE

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Studies on the total cross sections of the reaction $d+p \rightarrow {}^3\text{He} + \eta$ are of special interest since they differ strongly from pure phase space behavior near threshold. This can be explained by an unexpected strong final state interaction between η -mesons and ${}^3\text{He}$ nuclei which could lead to a quasi-bound state of the η - ${}^3\text{He}$ -system. High precision data from the ANKE spectrometer allow the extraction of precise total and differential cross sections for the η -production up to an excess energy of $Q = 15$ MeV and will be discussed. Assuming the FSI ansatz to be correct, the non-pure phase space behavior of the total cross section near threshold should be seen also in other η -production channels. Nevertheless, up to now none of such measurements could clearly prove whether the η -nucleus system is in a bound or virtual state. In order to further investigate this, a beam time was realized to study the properties of η -mesic nuclei with the reaction $p+d \rightarrow d+\eta+p$ spectator, where the initial deuteron serves as an effective neutron target. The combination of two beam momenta and the Fermi motion inside the deuteron allows to extract differential and total cross sections in a wide excess energy range between 0-100 MeV. The behavior of the total cross sections near threshold will allow to determine the scattering length ad_η to shed new light on the formation of η -mesic nuclei. Recent preliminary results on both reaction channels $d+p \rightarrow {}^3\text{He} + \eta$ and $p+d \rightarrow d+\eta+p$ spectator will be presented and discussed.