

Search for the ${}^3\text{He} - \eta$ bound state at COSY-11

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We present a summary of our search for the ${}^3\text{He} - \eta$ bound state via measurement of excitation curves for various reactions induced by the $d - p$ collisions in the neighborhood of the η production threshold. The experiment was done with the COSY-11 facility during a slow ramping of the COSY internal deuteron beam scattered on a proton target of the cluster jet type. The data on the $dp \rightarrow {}^3\text{He} \eta$ cross sections close to the kinematical threshold originating from the present experiment [1] and from similar measurements of the ANKE collaboration [2] indicate a presence of a pole in the ${}^3\text{He} - \eta$ S-wave scattering amplitude [3]. However, excitation curves for the $dp \rightarrow {}^3\text{He} \pi^0$, $dp, ppp\pi^-$ channels do not show structures which could originate from decays of ${}^3\text{He} - \eta$ bound state [4, 5]. A lack of a signal can be due to the limited statistics of the collected events and/or due to too narrow momentum range of the measured excitation curves.

- [1] J. Smyrski et al., Phys. Lett. B 649 (2007) 258
- [2] T. Mersmann et al., Phys. Rev. Lett. 98 (2007) 242301
- [3] C. Wilkin et al., Phys. Lett. B 654 (2007) 92
- [4] J.Smyrski et al., Acta Phys. Slov. 56 (2006) 213
- [5] J.Smyrski et al., Nucl. Phys. A 790 (2007) 438c

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