

Search for the η -mesic ${}^4\text{He}$ with WASA-at-COSY

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An exclusive measurement of the excitation function for the $dd \rightarrow {}^3\text{He}p\pi^-$ reaction was performed at the Cooler Synchrotron COSY-Jülich with the WASA-at-COSY detection system. The data were taken during a slow acceleration of the beam from 2.185 GeV/c to 2.400 GeV/c crossing the kinematic threshold for the η production in the $dd \rightarrow {}^4\text{He}\eta$ reaction at 2.336 GeV/c. The corresponding excess energy with respect to the ${}^4\text{He} - \eta$ system varied from -51.4 MeV to 22 MeV. No signal of the ${}^4\text{He} - \eta$ bound state was observed in the excitation function. An upper limit for the cross-section for the bound state formation and decay in the process $dd \rightarrow ({}^4\text{He} - \eta)_{\text{bound}} \rightarrow {}^3\text{He}p\pi^-$, was determined on the 90 % confidence level. In November 2010 a new data set was collected. The status of the research will be presented.