

Search for Bound Eta-Nucleus States

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The extracted s-wave scattering amplitude from both the polarized and unpolarized $d + d \rightarrow {}^4\text{He} + \eta$ reaction at 2385.5 MeV/c allowed to determine the scattering length which fulfills the requirements for bound eta. In the $p + {}^{27}\text{Al} \rightarrow {}^3\text{He} + p + \pi^- + X$ reaction studied at recoil free kinematics the eta meson is produced almost at rest and so it can be bound with enhanced probability. This state proceeds via $N^*(1535)$ resonance and the decay products proton and pion emitted into opposite direction are detected in coincidence with ${}^3\text{He}$ produced at zero degree. Under these conditions some hints for bound state can be observed with an upper limit of the cross section of ≈ 0.5 nb.

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