

## $\eta;d$ threshold structure from the $\gamma;d \rightarrow \pi^0 \eta;d$ reaction

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The  $\eta;d$  threshold structure has been experimentally studied in the  $\gamma;d \rightarrow \pi^0 \eta;d$  reaction at incident photon energies ranging from the reaction threshold to 1.15 GeV. An enhancement is observed near the  $\eta;d$  threshold in  $d\sigma/dM_{\eta;d}$ . The measured angular distribution of deuteron emission  $d\sigma/d\Omega_{\eta;d}$  is rather flat, which cannot be reproduced by the calculations based on the kinematics of quasi-free  $\pi^0 \eta;d$  production with deuteron coalescence even if the  $\eta;d$  final-state interaction is incorporated. The spin-parity of  $1^-$  is consistent for the enhancement with the  $\pi^0$  and  $\eta;d$ ; angular distributions for the events with  $M_{\eta;d} < 2.47$  GeV. Its Breit-Wigner mass and width are limited to 2.34-2.35 and 0-0.06 GeV, respectively, at 99% confidence level, suggesting a possible  $\eta;d$  bound state. In this talk, we present the  $\eta;d$  threshold enhancement, and its properties.

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