A Study of the $\eta\pi^0$ system Produced in the Reaction $\pi^- p \to \pi^+\pi^- 4\gamma n$ at 18 GeV/c

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Abstract

The exclusive reaction $\pi^- p \to \eta\pi^0 n$, $\eta \to \pi^+\pi^-\pi^0$, $\pi^0 \to 2\gamma$ at 18 GeV/c has been studied. Partial wave analysis has been performed on the 18,712 $\eta\pi^0 n$ events after the kinematic fitter SQUAW.

The phase motion between P_+ and D_+ waves is very similar to that of the $\eta\pi^-$ system [1]. The moments and angular distributions are well fitted by the PWA. A mass-dependent analysis, using "average solutions", favors of the resonant hypothesis with mass independent production phase. The non-resonant hypothesis needs a strong mass dependent production phase. There is a large systematic uncertainty for the exotic $J^{PC} = 1^{-+}$ mass when the ambiguous solutions are taken into account. The study gives the evidence of the neutral Hybrid production where C-parity is good quantum number.

[1] D.R.Thompson et al. Phys. Rev. Lett., **79**, 1630 (1997).