A Study of the $\omega\eta$ System Produced in the Reaction $\boldsymbol{\pi^- p \to \pi^+\pi^- 4\gamma n}$ at 18 GeV/c

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Results are presented on a study of structure in the $\omega\eta$ final state produced in $\pi^- p$ interactions at 18 GeV/c where $\omega \to \pi^+\pi^-\pi^0$, $\pi^0 \to 2\gamma$, and $\eta \to 2\gamma$. In the extended flux tube model, the $\omega\eta$ decay of an isoscalar $J^{PC} = 1^{--}$ hybrid meson is expected. The observed $\omega\eta$ invariant mass distribution rises rapidly from threshold but in general shows no obvious indication of resonant structure. However the result of a partial wave analysis finds both a $J^{PC} = 1^{--}$ signal consistent with the previously observed $\omega(1600)$ and a dominant $J^{PC} = 1^{+-}$ partial wave which exhibits phase motion relative to the $\omega(1600)$. The decay $\omega(1600) \to \omega\eta$ has not been previously reported.