Analysis of the f1 pi- system produced in pi-p interactions at 18 GeV/c

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Abstract

The reaction $\pi^- p \to f_1(1285)/\eta(1295)\pi^- p \to \eta\pi^+\pi^-\pi^- p$ at 18 GeV is being studied. The $f_1\pi^-$ system is expected to be an important decay mode for a hybrid meson and a previous experiment (BNL E818) has shown some evidence for such a state with $J^{PC} = 1^{-+}$. The existence of a high quality sample of $f_1(1285)/\eta(1295)\pi^-$ events in the $\eta\pi^+\pi^-\pi^- p$ final state has been established. Twelve thousand events have been selected from the 1994 E852 data run. A partial-wave analysis of this sample is presented. All waves are produced via natural parity exchange (i.e. $f_2(1270)$ or $\rho^0(770)$ exchange). The strongest contributions are from the 1^{++}, 1^{-+}, and 2^{-+} waves. Interesting relative phase motion is observed between these waves. A mass dependent analysis of these three waves has been performed to search for possible resonant structure in the data.