

A Study of 3π production in $\gamma p \rightarrow n\pi^+\pi^+\pi^-$ and $\gamma p \rightarrow \Delta^{++}\pi^+\pi^-\pi^-$ with CLAS at Jefferson Lab

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Apart from the mesons that the constituent quark model predicts, QCD allows for additional states beyond the $q\bar{q}$ system. Previous experiments have performed partial wave analysis on pion-production data and claim observation of a $J^{PC} = 1^{-+}$ state decaying via $\rho\pi$. The g12 experiment took place at Jefferson Lab using the CLAS spectrometer, a liquid hydrogen target was used and a tagged photon beam. By studying the reactions $\gamma p \rightarrow n\pi^+\pi^+\pi^-$ and $\gamma p \rightarrow \Delta^{++}\pi^+\pi^-\pi^-$, we are analyzing a large data-set of a three pion system. In the first reaction channel, events are selected with low four-momentum transfer to the neutron, in order to enhance one pion exchange production. The latter reaction is expected to be dominated by pion exchange between the baryon and the 3π meson system, given identification of Δ^{++} in the event. For both 3π system the data exhibits two intermediate decays, $\rho\pi$ and $f_2\pi$. An analysis of the kinematics and dynamics of those two data-sets is in progress, as well as a study of the angular distributions looking for resonance contributions. Preliminary results will be shown.