Study of the Lambda-proton mass peak in Kaon-Deutron reaction at 1.45 and 1.65 GeV energies

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Abstract
In this paper, we investigated the produced cusp in the \( \Lambda^0 p \) invariant mass spectrum from the \( K^- d \rightarrow \Lambda^0 p\pi^- \) reaction at \( K^- \) energies of 1.45 and 1.65 GeV. According to these calculations the peak of spectrum was around \( M_{\Lambda p} = 2130 \text{ MeV}/c^2 \) and the width was \( \Gamma = 13 \text{ MeV} \). To interpret this cusp we applied a coupled-channel treatment for the two decay processes \( \Lambda p \rightarrow \Lambda p \) and \( \Sigma N \rightarrow \Lambda p \). The results of the inelastic channel \( \Sigma N \rightarrow \Lambda p \) showed more consistency to the experimental data.

Keywords: coupled-channel treatments, \( \Lambda(2129) \) di-baryon, separable potential, \( \chi^2 \) fitting

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