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 $M_{\Lambda p} = 2130$ MeV/$c^2$ and the width was $\Gamma = 13$ 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, $H(2129)$ di-baryon, separable potential, $\chi^2$ fitting

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