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Low energy reaction $K^- p$ and the negative parity resonances

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The reaction K–p ⟶ η at low energies is studied with a chiral quark model approach. Good descriptions of the existing experimental data are obtained. It is found that (1670) dominates the reaction around threshold. Furthermore, u- and t-channel backgrounds play crucial roles in this reaction as well. The contributions from the D-wave state (1690) are negligibly small for its tiny coupling to η. To understand the strong coupling properties of the low-lying negative parity resonances extracted from the ¯KN scattering, we further study their
strong decays. It is found that these resonances are most likely mixed states between different configurations. Considering these low-lying negative parity resonances as mixed three-quark states, we can reasonably understand
both their strong decay properties from Particle Data Group and their strong coupling properties extracted from the ¯K N scattering. As a byproduct, we also predict the strong decay properties of the missing D-wave state |3
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–i3 with a mass of ~ 1.8 GeV. We suggest our experimental colleagues search it in the (1385)π and
π channels.

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