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Nuclear Theory

The Lambda* N interaction and two-body bound state based on chiral dynamics

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The interaction of Lambda*=Lambda(1405) with a nucleon is studied from the viewpoint of chiral dynamics. We construct the coordinate space Lambda* N potential in the meson-exchange picture, which serves as a fundamental ingredient for the study of the few-body nuclear systems with a Lambda*, the Lambda*-hypernuclei. The coupling constants concerning Lambda* are determined based on the chiral unitary model picture for the meson-baryon scattering where Lambda* is described as a superposition of two resonance poles. Solving the coupled-channel two-body Lambda* N system, we find the higher energy Lambda* N state develops an s-wave quasi-bound state slightly below the threshold in the total spin S=0 channel, which acquires a finite width through the coupling to the lower energy Lambda* N channel. We show important roles of the Kbar exchange contribution to the Lambda* N potential.

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