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Lattice QCD studies on Kbar-N interactions and Lambda(1405) in the flavor SU(3) limit

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We perform a numerical study in lattice QCD on $\Lambda(1405)$ in the flavor SU(3) limit. Previous studies based on the chiral symmetry have suggested that the spectrum corresponding to $\Lambda(1405)$ observed in experiments may be explained by a combination of two poles. To elucidate such property from lattice QCD, the HAL QCD method is employed, in which hadron interactions are extracted as potentials. Employing configurations in the flavor SU(3) limit, we calculate meson-baryon potentials in the octet and singlet channels, in which the poles corresponding to Lambda(1405) are expected to appear. We find that local potentials both in octet and singlet channels have singular behaviors, which prevent us from reliably extracting binding energies. To avoid such singular behaviors, we introduce a separable potential instead of the standard local approximation. Our results of potentials in both channels show attraction to produce bound states.

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