Spin doublet \((1^-, 2^-)\) of \(^6\Lambda\overline{\Lambda}\) within three-body cluster model

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The spin doublets \((1^-, 2^-)\) of \(^6\Lambda\overline{\Lambda}\) are of great interest for testing theoretical models of the hyperon-nucleon interaction. The experimental value -0.17 MeV is known for the binding energy of the state \(1^-\) (singlet spin state) of \(^6\Lambda\overline{\Lambda}\) [1]. The experimental data for the \(2^-\) state (triplet spin state) were not yet reported. Theoretical considerations for the state \(2^-\) of \(^6\Lambda\overline{\Lambda}\) have been attempted by Motoba et al. [2] and Hiyama et al. [3]. Indirect prediction for this state has been given in [4]. Results obtained in these works are quite different. Our goal is to obtain a new prediction for the hyper nucleus \(^6\Lambda\overline{\Lambda}\), which is considered as the cluster \(\alpha n\Lambda\), by using new proposed potentials for \(\alpha\Lambda\) and \(\alpha n\) interactions [5]. Our cluster calculation is based on the configuration-space Faddeev equations for a system of three non-identical particles. The energies of the \((1^- 2^-)\) spin doublets are calculated for different \(n\Lambda\) and \(\alpha\Lambda\) potentials [4-6]. Our results are compared with those from other calculations and experimental data.

[5] I. Filikhin et al. EPJ Web of Conferences 3, 07004 (2010);

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