Simple estimates of the masses of pentaquarks with hidden beauty or strangeness

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Abstract

The masses of cryptoexotic pentaquarks with hidden beauty are estimated phenomenologically using the results by the LHCb collaboration which discovered recently the cryptoexotic pentaquarks with hidden charm [1]. The expected masses of the hidden beauty pentaquarks are about 10.8 GeV and 10.7 GeV in the limit of some kind of heavy quark symmetry [2]. The states with hidden strangeness considered in similar way have masses about 2.37 Gev and 2.30 GeV, by several hundreds of MeV higher than states discussed previously in connection with the relatively light positive strangeness pentaquark θ^+ [3, 4]. Empirical data on spectra of pentaquarks can be used to get information about quarkonia interaction with nucleons. The results obtained for the case of heavy flavors are in fair agreement with model of isospin (pion) exchange between flavored baryons and anti-flavored vector mesons, proposed by Karliner and Rosner, and in qualitative agreement with the bound state version of the chiral soliton model. The influence of the change of soliton dimension (squeezing) on the energy of quantized states is investigated.

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