



量子物理学・ナノサイエンス第 90 回特別セミナー

Short-range baryon-baryon potentials in constituent quark model revisited

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概要

Understanding the baryon-baryon interactions has been an interesting topic in hadron physics, as they provide important clues to the quark dynamics inside baryons. In particular, due to experimental and numerical developments, the interactions between two baryons belonging to the octet (N, Lambda, Sigma, and Xi) and decuplet (Delta, Sigma*, Xi*, and Omega) in the flavor SU(3) sector have recently received much attention. In this context, systematic studies of the baryon-baryon interactions in the whole flavor SU(3) sector are helpful to unravel the mechanism of the baryon-baryon interactions.

In this talk, I present our calculation of the baryon-baryon interactions in the non-relativistic constituent quark model, where two-baryon systems are described as six-quark states using the so-called resonating group method. This is an extension of the quark model studies of Oka-Yazaki to cover all possible combinations of two baryons in the flavor SU(3) sector. As a result of the survey, we find that the flavor anti-decuplet states with total spin $J = 3$, namely Delta-Delta, Delta-Sigma*, Delta-Xi*-Sigma*, and Delta-Omega-Sigma*-Xi*, have attractive interactions sufficient to generate dibaryon bound states as hadronic molecules. We also discuss our method for evaluating the local potentials from the general baryon-baryon interactions.

連絡教員 慈道 大介 (内線 2083)