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Quark-Model Baryon-Baryon Interaction and Its Prospects in the Nuclear Matter Physics

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Baryon-baryon (BB) interactions are most fundamental in nuclear structure and matter properties. The purpose of this talk is to discuss properties of the realistic quark-model (QM) BB interaction and the prospects in the application to the nuclear matter physics. QM BB interactions are constructed in the framework of resonating-group method for two three-quark clusters[1]. QM BB interactions have two interesting features. One is the nucleon-nucleon (NN) short-range repulsion described by the nonlocal quark-exchange kernel, which gives quite different off-shell properties from standard meson-exchange potentials. The other is the Pauli principle on the quark level, which makes the ΣN ($I=1/2$) channel repulsive.

The most developed version of the QM by Kyoto-Niigata group, fss2, has achieved accurate descriptions of available NN and ΛN experimental data[2]. It has been successfully applied to the three-baryon systems ($3H$, $3\Lambda H$ [3] and three-nucleon scattering[4]) using the Faddeev framework. We now aim to apply the QM fss2 to the Brueckner-Hartree-Fock calculation. In this presentation, we introduce the general properties of the QM BB interactions and would like to discuss the prospects in the applications to the nuclear matter.

1. M. Oka, K. Yazaki, Phys. Lett. 90B, 41 (1980), Prog. Theor. Phys. 66, 556, 572 (1981).
2. Y. Fujiwara, Y. Suzuki and C. Nakamoto, Prog. Part. Nucl. Phys. 58, 439 (2007).
3. Y. Fujiwara, Y. Suzuki, M. Kohno and K. Miyagawa, Phys. Rev. C77, 027001 (2008).
4. Y. Fujiwara and K. Fukukawa, Few-Body Syst. 54, 2357 (2013), and references therein.

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