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Haldane Phase of Ultra Cold Atom Gas Loaded on Pseudo-One-Dimensional Optical Lattice KEITA KOBAYASHI, MASAHIKO OKUMURA, Center for Computational Science & e-System Japan Atomic Energy Agency, YUKIHIRO OTA, REKIN, SUSUMU YAMADA, MASAHIKO MACHIDA, Center for Computational Science & e-System Japan Atomic Energy Agency — Ultracold Fermi gas loaded on optical lattice (FGOL) has attracted considerable attention since its temperature, interaction, and filling factor are flexibly controllable and various quantum phases are accessible. In this study, we examine properties of pseudo-one-dimensional (P1D) FGOL obtained by including effects of the transverse excitations. At first, we prove that the P1D system at half-filling can be theoretically mapped on spin-1 Heisenberg chain. Secondly, we reveal by using DMRG scheme that Haldane phase emerges in the P1D FGOL. Finally, we clarify effects of trap potential and spin imbalance on not only the central Haldane phase but also various different magnetic structures around the Haldane phase.

Keita Kobayashi
Center for Computational Science & e-System Japan Atomic Energy Agency

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