Abstract Submitted
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**Systematic Ground-state Exploration for Strongly-interacting Fermions Loaded on Optical Lattices**[1] MASAHIKO MACHIDA, Japan Atomic Energy Agency, YOJI OHASHI, Keio University, HIDEKI MATSUMOTO, Tsukuba University, SUSUMU YAMADA, Japan Atomic Energy Agency — We systematically investigate ground state properties and effects of an optical lattice potential in one- and two-dimensional two-component trapped Fermi gases with the same population. Using an exact diagonalization method and a density-matrix renormalization group technique, we calculate the ground state many-body wavefunction, as well as the density profile, as a function of the strength of an attractive interaction. We show that fine inhomogeneous zigzag patterns universally emerge in the above models under the presence of attractive on-site interaction and trap potential Theoretical and numerical analyses suggest that these structures originate from an effective repulsive interaction between tightly-bound pairs and a breakdown of translational invariance. Furthermore, it is emphasized that the pattern obtained numerically in the 2-D model is the checkerboard type, which is very similar to results recently observed in a vortex core of High-Tc cuprate superconductor. In the presentation, we will touch imbalanced cases, too.

[1]JST(CREST)

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