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Direct extension to n-leg models in the density-matrix renormalization group method: An approach on the ground state of two-dimensional triangular Hubbard model[1] SUSUMU YAMADA, MASAHIKO OKUMURA, MASAHIKO MACHIDA, CCSE, Japan Atomic Energy Agency — In order to examine the ground state of two-dimensional triangular Hubbard model, we directly extend the density-matrix renormalization group (DMRG) method to n-leg lattice model. The leg extension requires not only an enormous memory space but also a huge CPU cost. Therefore, we propose an efficient and scalable parallel algorithm of the direct DMRG method and actually perform parallel numerical simulations of triangular 4- to 6-leg Hubbard models using 128 to 512 CPU's on SGI Altix 3700Bx2 in JAEA. In this presentation, we will briefly introduce the parallelization strategy, the implementation way, and show its performance including its scalability and accuracy. Furthermore, we reveal peculiar particle density distributions on n-leg triangular Hubbard models. These results are compared with the future experiments on atomic Fermi gases loaded on triangular optical lattices.

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Susumu Yamada
CCSE, Japan Atomic Energy Agency

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