**Chern number of many-body states on various lattices**

KOJI KUDO, University of Tsukuba, TOSHIKAZE KARIYADO, NIMS, YASUHIRO HATSUGAI, University of Tsukuba — The Chern numbers of many body states on lattices with magnetic field are numerically evaluated. Various lattice models are considered with short/long range particle-particle interaction projected into the Hofstadter type Landau band. The non-Abelian Berry connection defined by an approximate ground state multiplet is numerically constructed and used for the computation. For the $\nu = 1/m$ ($m$:odd) state for the weak field are consistently described by the Laughlin state with the $m$ fold topological degeneracy independent of the lattices. Effects of randomness are included and discussed with spectral flows as well. We have further discussed systems with strong magnetic field on the Kagome, square, honeycomb and triangular lattices. Even denominator states on lattices are also investigated in relation to the possible Fermi liquid state [K. Kudo, T. Kariyado, and Y. Hatsugai, in preparation].

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