

Topological phases of lattice bosons with a dynamical gauge field

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Optical lattices with a complex-valued tunneling term have become a standard way of studying gauge-field physics with cold atoms. If the complex phase of the tunneling is made density dependent, such a system features even a self-interacting or dynamical magnetic field. In this paper we study the scenario of a few bosons in either a static or a dynamical gauge field by means of exact diagonalization. The topological structures are identified computing their Chern number. Upon decreasing the atom-atom contact interaction, the effect of the dynamical gauge field is enhanced, giving rise to a phase transition between two topologically nontrivial phases.

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