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Topological insulators in cold-atom gases with non- Abelian gauge fields: the role of interactions PETER P. ORTH, Karlsruhe Institute of Technology (KIT), DANIEL COCKS, MICHAEL BUCHHOLD, Institut fuer Theoretische Physik, Goethe Universitaet, 60438 Frankfurt/Main, Germany, STEPHAN RACHEL, Yale University, KARYN LE HUR, 1 Center for Theoretical Physics, Ecole Polytechnique, 91128 Palaiseau Cedex, France, 2 Yale University, WALTER HOFSTETTER, Institut fuer Theoretische Physik, Goethe Universitaet, 60438 Frankfurt/Main, Germany — With the recent technological advance of creating (non)- Abelian gauge fields for ultracold atoms in optical lattices, it becomes possible to study the interplay of topological phases and interactions in these systems. Specifically, we consider a spinful and time-reversal invariant version of the Hofstadter problem. In addition, we allow for a hopping term which does not preserve S_z spin symmetry and a staggered sublattice potential. Without interactions, the parameters can be tuned such that the system is a topological insulator. Using a combination of analytical techniques and the powerful real-space dynamical mean-field (R-DMFT) method, we discuss the effect of interactions and determine the interacting phase diagram.

Peter P. Orth
Karlsruhe Institute of Technology (KIT)

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