

Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Growing scheme for topologically ordered states in interacting systems FABIAN LETSCHER, FABIAN GRUSDT, MICHAEL FLEISCHHAUER, Department of Physics and Research Center OPTIMAS, University of Kaiserslautern — We present a protocol for growing states with topological order in interacting many-body systems. The basic ingredients are explained using the superlattice Bose-Hubbard model as a simple toy model. Firstly, a topologically protected Thouless pump is used to create a local quasi-hole excitation. Secondly, a coherent pump refills the quasi-hole excitation with a single particle by making use of a blockade mechanism due to the repulsive interaction between the particles. In finite systems with dispersive bands, we discuss extensions to the protocol to maintain a high efficiency. The scheme can be used to grow the highly correlated Laughlin state in the fractional quantum Hall effect. We use an effective model based on the composite fermion description to simulate large lattice systems with many particles.

Fabian Letscher
Department of Physics and Research Center OPTIMAS,
University of Kaiserslautern

Date submitted: 29 Jan 2015

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