

Abstract Submitted
for the DAMOP18 Meeting of
The American Physical Society

Measuring topology by dynamics: Chern number from linking number CHRISTOF WEITENBERG, MATTHIAS TARNOWSKI, University of Hamburg, F. NURNAL, Max-Planck Institute for the Physics of Complex Systems, NICK FLSCHNER, BENNO S. REM, University of Hamburg, ANDR ECKARDT, Max-Planck Institute for the Physics of Complex Systems, KLAUS SENGSTOCK, University of Hamburg — Topology plays an important role in modern solid state physics describing intriguing quantum states such as topological insulators. It is an intrinsically non-local property and therefore challenging to access, often studied only via the resulting edge states. Here, we measure the topological index directly from the far-from equilibrium dynamics of the bulk. We use the mapping of the Chern number to the linking number of dynamical vortex trajectories appearing after a quench to the Hamiltonian of interest. We thereby map out the topological phase diagram of quantum gases in optical lattices via a purely dynamical response. Such relations between two topological indices in static and dynamical properties could be also an important approach for exploring topology in the case of interactions.

Christof Weitenberg
University of Hamburg

Date submitted: 26 Jan 2018

Electronic form version 1.4