Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Quantized topological transport in open systems induced by topology transfer LUKAS WAWER, MICHAEL FLEISCHHAUER, University of Kaiserslautern — Topological states of matter have fascinated physicists since a long time. Motivated by topological charge pumps, we introduced a classification of topological phases of matter in finite-temperature as well as stationary states of driven, dissipative, systems of non-interacting fermions based on a many-body invariant [1]. While the integer-valued transport of particles in topological charge pumps breaks down at finite temperatures, the winding of the topological invariant remains strictly quantized. Here we show that quantized particle transport can be restored by transferring the topological properties of the finite-temperature system to an auxiliary system of free fermions, initially prepared at $T = 0$. Cooling the auxiliary system continiously to low temperature realizes a temperature robust topological charge pump. It also allows us to detect the topological invariant of the open system in a direct way. Finally the quantized transport in the auxiliary system could also be used to define topology of mixed states of interacting systems.
[1] C.E. Bardyn, L. Wawer, A. Altland, M. Fleischhauer, S.Diehl, Phys. Rev. X 8, 011035 (2018)

Lukas Wawer
University of Kaiserslautern

Date submitted: 30 Jan 2020 Electronic form version 1.4