Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Characterization & Transport Signatures of Periodically Driven Topological Phases MICHEL FRUCHART, PIERRE DELPLACE, KRZYSZTOF GAWEDZKI, DAVID CARPENTIER, Laboratoire de Physique, ENS de Lyon —

The discovery of the Quantum Hall Effect in the 80's opened the field of topological phases of matter, which has been renewed by the discovery of a new kind of topological insulator in 2005, this time in a time-reversal invariant system. In order to obtain a material with tunable topological properties, research were carried out on out-of-equilibrium systems subject to a periodic drive. Such periodically driven topological phases turn out to be richer that their equilibrium counterparts. We consider a 2D crystal subject to a drive periodic in time, constrained so that is is time-reversal invariant and show that such a system is characterized by Z2 indices attached to a gap (and not to a band), which we explicitly construct. To probe these out-of-equilibrium phases in a phase coherent regime, we use standard transport measurements. With the help of numerical simulations, we show that the running time-averaged differential conductances are quantized in a topological gap, and that multi-terminal setups enable to probe the chirality of the out-of-equilibrium topological states.

Michel Fruchart
Laboratoire de Physique, ENS de Lyon

Date submitted: 26 Oct 2015

Electronic form version 1.4