MAR16-2015-020005

Abstract for an Invited Paper
for the MAR16 Meeting of
the American Physical Society

Floquet States: Anomalous topological phases and steady state engineering

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Periodically driven quantum systems provide a novel and versatile platform for realizing topological phenomena. In my talk I'll provide a brief introduction to the Floquet path to topological behavior. Next, I will concentrate on a remarkable Floquet state that has no static analog: A 2d system which has chiral edge states, alongside fully localized bulk orbitals. This unique situation serves as the basis for a new topologically-protected non-equilibrium transport phenomenon: quantized non-adiabatic charge pumping. We identify the bulk topological invariant that characterizes this new phase,which we dub the 'anomalous Floquet Anderson Insulator'. In the second part of my talk, I will discuss recent results on stabilizing desired steady states in periodically driven fermionic semiconducting systems using bosonic and fermionic bath engineering.