Floquet topological insulators, nonlinear envelope dynamics, and interface modes

Sean Nixon

Department of Applied Mathematics, University of Colorado, Boulder

Abstract

The search for novel phenomena in photonic waveguides centers on engineering systems that feature unique dispersive properties including the study of topological (global) properties of the spectrum. Lattices featuring longitudinally driven waveguides result in topological insulators and protected edge modes. This talk will give an introduction to topological photonics and the analytical tools capable of deriving reduced dynamical systems to model the Floquet spectrum. These tools range from tight-binding approximations to multiple-scales analysis and provide an approach that will be applicable in a wide range of waveguide arrays with nontrivial topologies. Using these reduced models we investigate topological constants like the Chern number, nonlinear envelope dynamics and the behavior of interface modes.