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Topology in Floquet-Bloch systems: physics beyond the topological insulators[1]

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Floquet theory provides a powerful framework for understanding the dynamics of periodically-driven quantum systems. When applied to systems with spatially periodic potentials, the emergence of Floquet-Bloch quasienergy bands suggests many exciting opportunities to explore topological phenomena through analogies to those known in equilibrium. Due to the periodicity of quasienergy, however, the topological classification of periodically-driven systems is richer than that of static systems. This opens the way for discovering truly new, non-equilibrium topological phenomena. For example, a one dimensional Floquet system may host chiral bands, while in two dimensions a system whose Floquet bands all have zero Chern numbers may support robust chiral edge states. In this talk I will address the question: when is a Floquet-Bloch system *not* like a static system? I will discuss both general considerations, based on the structure of the time-dependent Floquet-Bloch evolution operator, and specific examples which highlight the possibilities available in both non-interacting and interacting systems.

[1]In collaboration with: Frederik Nathan (Copenhagen), Erez Berg (Weizmann), Netanel Lindner (Technion), Michael Levin (Chicago)