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Alchemy for the 21st century: creating topological behavior in periodically-driven systems

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Recent work on topological materials has revealed a wide variety of intriguing phenomena that may arise when particles move in “non-trivial” bands. Modern advances in experimental capabilities for controlling electronic, atomic, and optical systems raise the possibility that analogous phenomena may be generated dynamically in driven systems. In this talk I will review the basic ideas behind topological band theory, and then discuss the corresponding situation for periodically driven systems. In the driven case, intriguing new types of robust topological phenomena emerge. I will explain how this occurs, and give some outlook on recent and proposed experiments on these so-called Floquet topological insulators.

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