MAR17-2016-009810

Abstract for an Invited Paper
for the MAR17 Meeting of
the American Physical Society

Floquet Time Crystals[1]

DOMINIC ELSE, University of California, Santa Barbara

Periodically driven (Floquet) systems provide a setting to realize entirely new non-equilbrium phases of matter without stationary analogs. A unifying way to understand such phases is in terms of symmetries; Floquet phases of matter have a discrete time-translation symmetry which can protect new dynamical phases of matter. In this talk, we characterize a dramatic example of such a phase: the "Floquet time crystals", in which the discrete time-translation symmetry is spontaneously broken and local observables oscillate at some fraction of the drive frequency. We discuss two scenarios by which Floquet time crystals can be stabilized: many-body localization and pre-thermalization. In the latter case, Floquet ordering persists until a thermalization time that is exponentially large in a small paramater. We show that pre-thermalization also allows other Floquet phases of matter to be stabilized, including some which have too much symmetry to be compatible with many-body-localization.

[1]In collaboration with Bela Bauer and Chetan Nayak