

Abstract Submitted
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Long-Range Pre-Thermal Time Crystals FRANCISCO MACHADO, University of California - Berkeley, DOMINIC V. ELSE, University of California - Santa Barbara, CHETAN NAYAK, Station Q - Microsoft Research, University of California - Santa Barbara, NORMAN YAO, University of California - Berkeley — Driven quantum systems have recently enabled the realization of a discrete time crystal — an intrinsically out-of-equilibrium phase of matter that spontaneously breaks time translation symmetry. One strategy to prevent the drive-induced, runaway heating of the time crystal phase is the presence of strong disorder leading to many-body localization. A simpler disorder-less approach is to work in the pre-thermal regime where time crystalline order can persist to long times, before ultimately being destroyed by thermalization. In this talk, we will consider the interplay between long-range interactions, dimensionality, and pre-thermal time-translation symmetry breaking. As an example, we will consider the phase diagram of a 1D long-range pre-thermal time crystal.

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