Seminar/Talk

Discrete (Floquet) Time Crystals

Wen Wei Ho
University of Geneva

Host: Maksym Serbyn

Spontaneous symmetry-breaking is a fundamental concept in physics that underpins much of our understanding of equilibrium phases of matter, such as the sharp distinction between a solid crystalline phase and a liquid phase arising from spontaneously broken spatial translational symmetry. Recently, it was realized that time-translational symmetry can also be spontaneously broken [1,2]. More precisely, periodically-driven (Floquet) disordered interacting many-body systems may exhibit such a phenomenon -- in such systems, physical observables exhibit robust oscillations that is an integer multiple of the driving period T -- leading to a novel, nonequilibrium phase of matter dubbed a ``discrete time crystal" (DTC). In this talk, I will introduce the idea of discrete time crystals, and discuss the key concepts involved in defining this new nonequilibrium phase of matter. I will also explain the mechanism by which the DTC phase is stabilized, such as many-body localization (MBL) or `critically-slow' thermalization in disordered long-range systems [3], thereby providing an explanation for the recent experimental observation of robust DTC order in a diamond sample with NV-center impurities [4].

[1] Else, D., Bauer, B. and Nayak, C., Phys. Rev. Lett (117) 090402 (2016)
[2] von Keyserlingk, C.W., Khemani, V. and Sondhi, S., Phys. Rev. B (94) 085112 (2016)
[3] Ho, W. W., Choi, S., Lukin, M., and Abanin, D., Phys. Rev. Lett (119) 010602 (2017)
[4] Choi, S. et al., Nature 543, 221 225 (2017)

Tuesday, August 1, 2017 11:00am - 12:30pm

Big Seminar room Ground floor / Office Bldg West (I21.EG.101)

This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station. Please find a schedule of the ISTA Shuttle on our webpage: https://ista.ac.at/en/campus/how-to-get-here/ The ISTA Shuttle bus is marked ISTA Shuttle (#142) and has the Institute Logo printed on the side.