



Physical Sciences Seminar

Dynamical regimes of strongly correlated electrons under periodic driving

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Periodically driven (Floquet) quantum systems may host interesting phenomena, such as topological phases of ultra-cold atoms [1] and light-induced superconductivity [2]. These systems are a long-standing subject of theoretical studies, which recently focused on isolated quantum many-body systems [3]. In the seminar I will discuss recent results [4] on the periodically driven Fermi-Hubbard model – a prototype of strongly correlated electrons. First, I will show that for moderate interaction the system thermalizes, as expected for generic isolated many-body systems. Then, I will describe the emergence of a prethermal regime (Floquet prethermalization) as the interaction is increased. This regime is a consequence of a well-known bottleneck mechanism, that is the quasi-conservation of doublon excitations at large interaction. Finally, I will discuss the existence of a critical drive frequency at which the system thermalizes despite the large interaction, due to a resonant condition of the drive frequency with the doublon excitation energy. References [1] G. Jotzu, M. Messer, R. Desbuquois, M. Lebrat, T. Uehlinger, D. Greif, and T. Esslinger, Experimental realisation of the topological Haldane model, *Nature* 515, 237 (2014). [2] M. Mitrano, A. Cantaluppi, D. Nicoletti, S. Kaiser, A. Perucchi, S. Lupi, P. Di Pietro, D. Pontiroli, M. Riccio, S. R. Clark, D. Jaksch, and A. Cavalleri, Possible light-induced superconductivity in K₃C₆₀ at high temperature, *Nature* 530, 461 (2016). [3] R. Moessner and S. L. Sondhi, Equilibration and Order in Quantum Floquet Matter, *Nature Physics* 13, 424 (2017). [4] F. Peronaci, M. Schirò, and O. Parcollet, Resonant thermalization of periodically driven strongly correlated electrons, arXiv:1711.07889 (2017).

Tuesday, March 6, 2018 11:00am - 12:30pm

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



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