Physical Sciences Seminar

Entanglement entropy in highly excited eigenstates of many-body lattice

Marcos Rigol
PennState University

Host: Maksym Serbyn

The average entanglement entropy of subsystems of random pure states is (nearly) maximal [1]. In this talk, we discuss the average entanglement entropy of subsystems of highly excited eigenstates of integrable and nonintegrable many-body lattice Hamiltonians. For translationally invariant quadratic models we prove that, when the subsystem size is not a vanishing fraction of the entire system, the average eigenstate entanglement entropy departs from that of random pure states. We also prove that typical eigenstates of such Hamiltonians exhibit eigenstate thermalization for local observables [2]. For random pure states with a fixed particle number (away from half filling) and normally distributed real coefficients, we prove that the deviation from the maximal value grows with the square root of the system's volume. The behavior of the entanglement entropy of highly excited eigenstates of a particle number conserving quantum chaotic model is found to agree with the analytical results for the random canonical states [3]. References: [1] D. N. Page, Phys. Rev. Lett. 71, 1291 (1993). [2] L. Vidmar, L. Hackl, E. Bianchi, and M. Rigol, Phys. Rev. Lett. 119, 020601 (2017). [3] L. Vidmar and M. Rigol, Phys. Rev. Lett. 119, 220603 (2017).

Friday, May 11, 2018 11:00am - 12:00pm

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

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