Nonequilibrium dynamics of bosonic supercurrents in a two coupled ring geometry: Nonergodicity and current self trapping RAFAEL HIPOLITO, ANATOLI POLKOVNIKOV, Boston University — Interacting systems do not always exhibit ergodic behavior, as it was first observed in the seminal work of Fermi, Pasta, and Ulam (FPU). Subsequently, it was found that many such systems exhibiting nonergodicity have a special property known as integrability, where the system has as many conserved quantities as degrees of freedom. These systems can exhibit interesting quasiperiodic dynamics (e.g. near revival of the initial nonequilibrium state), in stark contrast to the essentially chaotic dynamics experienced in systems out of equilibrium. Most of the focus in these studies has been on classical integrable systems. In this talk we analyze dynamics of bosonic supercurrents in a two coupled ring geometry. We find that in the classical (Gross-Pitaevskii) limit the dynamics very closely resembles that of FPU system suggesting that these phenomena can be experimentally probed in cold atom systems. We also show that weak quantum fluctuations suppress long time revivals leading to more ergodic behavior.

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