Probing Quantum Dynamics with Strongly-driven Degenerate Gases

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Ultracold neutral atoms offer a nearly ideal context for the investigation of quantum systems driven far from equilibrium. I will present results from a sequence of experiments on dynamical quantum simulation, starting with the first experimental realization of a relativistic harmonic oscillator, moving on to Floquet engineering of band structure and transport properties, and concluding with the observation of Floquet prethermalization in driven interacting quantum matter.