
SEMINAR: Quasicrystals, Many-Body Localisation and Bose Glasses

SHAURYA BHAVE

November 25, 2024

12:00 to 13:00

Seminar Room

Quasicrystalline patterns possess long-range order but lack periodicity. This places them in the spectrum of materials between clean, ordered crystals and disordered, amorphous solids. They share properties of both disordered structures and ordered materials, resulting in a rich variety of physical phenomena.

This presentation discusses a novel ground state phase exhibited by our eightfold symmetric optical quasicrystal: the Bose glass. This is a localised phase resulting from the interplay of disorder, in the form of aperiodicity, and interactions

In this regard, I will detail two experiments. The first experiment measures the ground state phase diagram of the quasicrystal as a function of both the lattice depth and interaction strength. The 2D optical quasicrystal is found to support both a superfluid (extended) phase and a Bose glass (localised) phase.

The second experiment explores the quench dynamics of this phase transition. Rapidly crossing the BG/SF phase boundary induces transient out-of-equilibrium dynamics that depend on properties of the underlying Hamiltonian

. This establishes quantum quenches as a means to uncover the relaxation dynamics in the long and short term following a rapid change in parameter.

Hosted by: Prof. Dr. Leticia Tarruell