Abstract Submitted
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Observing localisation in a 2D quasicrystalline optical lattice.[1] JR-CHIUN YU, Univ of Cambridge, MATTEO SBROSCIA, Jet Propulsion Laboratory, California, KONRAD VIEBAHN, Institute for Quantum Electronics, ETH Zurich, EDWARD CARTER, ULRICH SCHNEIDER, Univ of Cambridge, MANYBODAY QUANTUM DYNAMICS TEAM — Quasicrystals are long-range ordered but not periodic and represent an interesting middle ground between order and disorder. I will present how we experimentally realise a two-dimensional quasicrystaline optical lattice for ultracold atoms with eightfold rotationally symmetric. [1] By studying the diverging timescale required for adiabatically loading, we probe the disorder-induced localised phase and demonstrate its resilience against to interactions. [2] Our experimental results are consistent with a mean-field shift of the localisation transition. Quasiperiodic potentials, lacking conventional rare regions, provide the ideal testing ground to realise many-body localisation in 2D. [1] Konrad Viebahn, Matteo Sbroscia, Edward Carter, Jr-Chiun Yu, Ulrich Schneider. "Matter-wave diffraction from a quasicrystalline optical lattice". Phys. Rev. Lett. 122, 110404 (2019). [2] Matteo Sbroscia, Konrad Viebahn, Edward Carter, Jr-Chiun Yu, Alexander Gaunt, Ulrich Schneider. "Observing localisation in a 2D quasicrystalline optical lattice". arXiv:2001.10912 (2020).

[1]EPSRC, ERC, DesOEQ,

Jr-Chiun Yu
Univ of Cambridge

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