

Observation of the Anderson transition in a 4D quantum system with synthetic dimensions

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The localization-delocalization transition in disordered media is ubiquitous in quantum and classical systems. It is one of the rare transitions for which there is no mean-field theory valid in any dimensions. We report the observation and characterization of the Anderson transition in 4D using ultracold atoms as a quantum simulator with synthetic dimensions.

We will give a pedagogical introduction to disordered quantum systems and their quantum simulation with Floquet driving. We will then characterize the universal dynamics in the vicinity of the phase transition and measure the critical exponents describing the scale-invariant properties of the critical dynamics.