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Taming The Non-Equilibrium

Complex quantum systems out of equilibrium are at the basis of a number of the most intriguing puzzles in physics. This talk will be concerned with recent progress on understanding how quantum many-body systems out of equilibrium eventually come to rest and thermalise. The first part of the talk will highlight theoretical progress on this question, taking in several ways a quantum information view - employing ideas of Lieb-Robinson bounds, quantum central limit theorems and of concentration of measure. These findings will be complemented by experimental work with ultra-cold atoms in optical lattices, in setups constituting dynamical "quantum simulators", allowing to probe physical questions that are not only out of reach for state-of-the-art numerical techniques based on matrix-product states, but also relate to classically computationally hard problems.