

Quantum Simulation with Periodically-driven Superconducting Quantum Processors

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In recent years we have witnessed a fast development in quantum technologies. This is not only of interest for practical applications of quantum devices, but it also allows us to understand the nature and robustness of ergodicity, which is a fundamental concept in statistical mechanics [1,2,3]. In this talk, I will discuss one of the most promising applications of superconducting devices as quantum simulators of material science [4], which opens a new avenue for practical applications of near-term quantum devices. In our simulation, we couple a driven domain in the ergodic regime to a disordered domain, which allows us to investigate the robustness of localized states when coupled to quantum reservoir [5]. We experimentally simulate an ergodic-localized junction by using a superconducting device with 12 qubits [6]. I will discuss in detail the experimental realization and future perspectives of our work.

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