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“Novel quantum dynamics with superconducting qubits”

In recent years, superconducting qubits have emerged as one of the leading platforms for quantum computation and simulation. We utilize these Noisy Intermediate Scale Quantum (NISQ) processors to study quantum dynamics. I will present some of our recent works in studying robustness of bound states of photons [1], universality classes of dynamics in the 1D Heisenberg chain [2], and braiding of non-Abelian excitations [3]. These works point to the subtleties of non-equilibrium dynamics of highly entangled states in many-body systems ; they provide evidence that in the absence of full-fledged quantum processors, the NISQ processors have challenged and guided our conventional wisdom.

[1] Morvan *et al.*, [Nature 612, 240–245 \(2022\)](#)

[2] Rosenberg *et al.*, [Science 384, 48-53 \(2024\)](#)

[3] Andersen *et al.*, [Nature 618, 264–269 \(2023\)](#)