**Probing entanglement dynamics and topological transitions on noisy intermediate-scale quantum computers**

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In this talk, I will present our recent results on the simulation of quench dynamics of the Su-Schrieffer-Heeger (SSH) chain on the IBM quantum computers. The Rényi entanglement entropy, the twist order parameter and the Berry phase are computed to study the dynamics of the quantum state. The Rényi entropy is obtained using a recently developed randomized measurement method. The twist order parameter and the Berry phase are measured without the need for additional gates or ancilla qubits, making them particularly applicable on near-term quantum computers. We consider quench protocols in which a trivial initial state evolves dynamically in time under the topological SSH Hamiltonian in the fully dimerized limit. During these quenches, the time evolution of entanglement entropy, twist order parameter and Berry phase show persistent and periodic oscillations. Through the implementation of error mitigation techniques based on the global depolarizing error model and postselection according to symmetry preservation, our simulations on the IBM Q devices yield results that closely match exact solutions. Furthermore, a parallel automation program for the randomized measurement method has been developed for efficient simulations.