



Physical Sciences Seminar

Novel quantum dynamics with superconducting qubits

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Superconducting qubits have emerged as a leading platform for quantum computation and simulation, particularly for studying quantum dynamics on Noisy Intermediate-Scale Quantum (NISQ) processors. In a recent study [1], we explore the dynamics of charges and strings in (2+1)D lattice gauge theories, using these processors to directly image string behavior. We find two distinct regimes within the confining phase: in the weak confinement regime, the string exhibits strong transverse fluctuations, while in the strong confinement regime, these fluctuations are effectively suppressed. In another study [2], we observe a novel form of localization in quantum many-body systems in one and two dimensions. Despite the absence of disorder, perturbations do not spread, even when both the evolution generator and initial states are fully translationally invariant. These results demonstrate that NISQ processors – in the absence of fully-fledged quantum processors – are valuable tools for probing non-equilibrium systems, offering critical insights into complex quantum dynamics. [1] Cochran et al., arxiv.org/abs/2409.17142[2] Gyawali et al., arxiv.org/abs/2410.06557

Tuesday, November 26, 2024 11:00am - 12:00pm

Office Building West/Ground Floor/Heinzel Seminar Room



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