



Colloquium

Monitored quantum matter

Michael Buchhold

University of Innsbruck

Host: Maksym Serbyn

Abstract: Understanding and actively shaping quantum entanglement in many-body systems is a key challenge for modern quantum technologies. Recently, monitored quantum dynamics — quantum dynamics with mid-circuit measurements — has emerged as a powerful tool for harnessing entanglement in NISQ devices and simulating non-equilibrium dynamics in condensed matter systems. In this talk, I will discuss our recent understanding of entanglement in monitored quantum dynamics from the viewpoint of emergent many-body phases and universality. Monitored dynamics generate wave functions with robust entanglement structures, which depend only on global properties such as symmetry and dimensionality, thereby defining entanglement phases of monitored quantum matter. We anticipate a symmetry classification of monitored matter akin to equilibrium quantum matter in Hamiltonian systems, which I will introduce using exemplary systems in one and two dimensions. I will also highlight our recent analytical and numerical advances and how they can be applied to engineer entanglement, for instance, in adaptive quantum circuits and driven quantum materials. -- Michael Buchhold Professor of Theoretical Physics, Department of Theoretical Physics, Universität Innsbruck, Austria Tel.: +43 512 507 52210 Email: michael.buchhold@uibk.ac.at Homepage: <https://www.uibk.ac.at/en/th-physik/nonequilibrium-quantum-matter/>

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Office Building West/Ground Floor/Heinzel Seminar Room



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