

Abstract Submitted
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Lattice gas dynamics under continuous measurement¹ YOGESH SHARAD PATIL, HIL F. H. CHEUNG, IVAYLO S. MADJAROV, HUIYAO Y. CHEN, MUKUND VENGALATTORE, Cornell University — The act of measurement has a profound consequences quantum systems. While this backaction has so far been discussed as being a limitation on the precision of measurements, it is increasingly being appreciated that measurement backaction is a powerful and versatile means of quantum control. We have previously demonstrated that backaction from position measurement can modify the coherent tunneling rate of a lattice gas through the Quantum Zeno effect [1]. Here, we show how spatially designed measurement landscapes can be used to realize entropy segregation in lattice gases. This presents an alternate path to the longstanding challenge of realizing lattice gases with sufficiently low entropy to access regimes of correlated quantum behavior such as Néel ordered states.

[1] Y. S. Patil, S. Chakram and M. Vengalattore, Phys. Rev. Lett. 115, 140402 (2015)

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