Abstract Submitted
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Quantum Metrology and Many-Body Decoherence.[1] MATHIEU BEAU, Univ of Mass - Boston, AURELIA CHENU, JIANSHU CAO, Massachusetts Institute of Technology, ADOLFO DEL CAMPO, Univ of Mass - Boston — We introduce a scheme for the quantum simulation of many-body decoherence that relies on the unitary evolution generated by a stochastic Hamiltonian including k-body interactions [2]. We propose to modulate the strength of the interactions with a stochastic process, and show that the dynamics of the noise-averaged density matrix is effectively open and governed by k-body Lindblad operators. Our proposal can be readily implemented on a variety of quantum platforms such as optical lattices, superconducting circuits, and trapped ions. It also has interesting applications in quantum metrology. After deriving the Quantum Cramér-Rao bound for quantum open systems, we provide the conditions for robustness of the Heisenberg limit in the presence of many-body decoherence.

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[2]A. Chenu, M. Beau, J. Cao, and A. del Campo, Quantum Simulation of Many-Body Decoherence: Noise as a Resource, arxiv/1608.01317 (2016).

Mathieu Beau
Univ of Mass - Boston

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