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Dissipative effects in dipolar, quantum many-body systems[1]
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We use Quantum Monte Carlo simulations, by the Worm algorithm, to study the ground state phase diagram of two-dimensional, dipolar lattice bosons where each site is coupled, via density operators, to an external reservoir. A recent related study of the XXZ model with ohmic coupling to an external reservoir reported the existence of a bath-induced Bose metal phase in the ground state phase diagram away from half filling, and a Luttinger liquid and a charge density wave at half-filling [1]. Our work extends this methodology to higher dimensional systems with long-range interactions. In the case of hard-core bosons, our method can be applied to experimental systems featuring dipolar fermionic molecules in the presence of losses. This work utilized the Janus supercomputer, which is supported by the NSF (award number CNS-0821794) and the University of Colorado Boulder, and is a joint effort with the University of Colorado Denver and the National Center for Atmospheric Research, as well as OU Supercomputing Center for Education and Research (OSCER) at the University of Oklahoma.

[1] Zi Cai, Ulrich Schollwock, Lode Pollet, arXiv:1409.0142

[1]NIST, JILA-NSF- PFC-1125844, NSF-PIF-1211914, NSF-PHY11-25915, ARO, ARO-DARPA-OLE, AFOSR, AFOSR-MURI

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