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Exact Diagonalization of a Quantum XXZ Model with Long-Range Interactions¹ JUSTIN A. WILLIAMS, DAVID A. SMITH, University of West Florida, C.C.-JOSEPH WANG, None, CHRISTOPHER N. VARNEY, University of West Florida — In recent years, rapid advancement has been made in using ultra-cold gases as quantum spin simulators, with two dimensional lattices becoming a rich target for exploring the exotic states and excitations of spin-1/2 systems on frustrated lattices. When the interaction in the system becomes long-ranged, the spins are frustrated by the long-range interaction. Consequently, the competition between the geometric frustration and the long-range interaction results in the the underlying orders present in the ground state being unclear. Here, we investigate the quantum dipolar XXZ model with exact diagonalization to characterize and contrast the ground state and excitations on square and triangular lattices to provide a baseline for comparison with experiments.

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