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Quantum Monte Carlo study of dipolar lattice bosons in the presence of random diagonal disorder CHAO ZHANG, Homer L. Dodge Department of Physics and Astronomy, The University of Oklahoma, Norman, Oklahoma, 73019, USA, ARGHAVAN SAFAVI-NAINI, JILA and Department of Physics, University of Colorado, 440 UCB, Boulder, CO 80309, USA, BARBARA CAPOGROSSO-SANSONE, Homer L. Dodge Department of Physics and Astronomy, The University of Oklahoma, Norman, Oklahoma, 73019, USA — We report the results of our study of dipolar bosons in a two dimensional optical lattice in the presence of random diagonal disorders using Path Integral Quantum Monte Carlo simulations. We study the phase diagram at half filling which features three phases: superfluid, checkerboard solid and bose glass. We observe that, in contrast to the standard Bose-Hubbard model in presence of diagonal disorder, superfluidity is destroyed at considerable lower disorder strengths in favor of the Bose glass phase. Additionally we find that as the disorder strength increases, larger dipolar interaction is required in order to stabilize a checkerboard solid.

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