A Superglass Phase of Interacting Bosons ROGER MELKO, KA-MING TAM, SCOTT GERAEDTS, STEPHEN INGLIS, MICHEL GINGRAS, University of Waterloo — Motivated by recent experimental suggestions of glassy behavior in supersolid Helium, we introduce a Bose-Hubbard Hamiltonian with random disordered interactions as a model to study the interplay of superfluidity and glassiness in a system of three-dimensional bosons. Solving the model using large-scale quantum Monte Carlo simulations, we show that these disordered interactions promote a stable superglass phase, where superflow and glassy density localization coexist in equilibrium without exhibiting phase separation. The robustness of the superglass phase is underlined by its existence in a replica mean-field calculation on the infinite-dimensional Hamiltonian.

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