

Abstract Submitted
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Sign-Alternating Interaction Mediated by Strongly-Correlated Lattice Bosons BARBARA CAPOGROSSO-SANSONE, ITAMP, Harvard, SEB-NEM SOYLER, NIKOLAY PROKOF'EV, BORIS SVISTUNOV, University of Massachusetts — We reveal a generic mechanism of generating sign-alternating inter-site interactions mediated by strongly correlated lattice bosons. The ground state phase diagram of the two-component hard-core Bose-Hubbard model on a square lattice at half-integer filling factor for each component, obtained by worm algorithm Monte Carlo simulations, is strongly modified by these interactions and features the solid+superfluid phase for strong anisotropy between the hopping amplitudes. The new phase is a direct consequence of the effective nearest-neighbor repulsion between “heavy” atoms mediated by the “light” superfluid component. Due to their sign-alternating character, mediated interactions lead to a rich variety of yet to be discovered quantum phases.

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