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The effective U(1)-Higgs theory at strong coupling on optical lattices?

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We study the U(1)-Higgs model in two dimensions in the strongly coupled regime. The goal is to generate an effective theory where link variables are integrated out, producing 4-field operators. This theory can be matched with the second-order perturbation theory effective Hamiltonian for the Bose-Hubbard model. Such correspondence can then be exploited for building a lattice gauge theory simulator on optical lattices.

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