**Paired phases of bosons in optical lattices** STEPHEN POWELL, Yale University, SUBIR SACHDEV, Harvard University — We describe the conditions under which bosons in optical lattices can form paired condensates, focusing on the case of bosons with spin. We show that the ground state of such a system, with sufficiently strong spin-dependent interactions, is a *spin-singlet condensate*, which preserves spin-rotation symmetry. We then consider the gapped single-particle excitations across the phase transition from the insulator, and show that they have nontrivial scaling behavior, determined by coupling to the critical pair modes.

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