

Abstract Submitted  
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**Attractive Bosons in Optical Lattices**<sup>1</sup> DANIEL GOLDBAUM,  
ERICH MUELLER, Cornell University — We study the theory of attractive bosons  
in an optical lattice with a hard-core constraint, limiting on-site occupations to 0, 1,  
or 2 particles per site. Our goal is to investigate the Boson pairing phase transition.  
We describe how an off-resonant Raman photoassociation transition [C. Ryu, et. al.  
Cond-mat/0508201] may be used to generate this model. We explore the properties  
of this system through a mean-field theory that allows short-range correlations. We  
write a wavefunction that describes both atomic and molecular superfluid phases,  
and study properties of the system near the phase transition, including the structure  
of vortices.

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Daniel Goldbaum  
Cornell University

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