

Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Vortex lattices of bosons in deep rotating lattices¹ DANIEL GOLDBAUM, ERICH MUELLER, Cornell University — We study vortex-lattice phases for a Bose gas trapped in a rotating optical lattice near the Mott-Hubbard transition. Unlike the case of shallow lattices, the physics in this regime is dominated by the strong on-site interaction between bosons. We find a series of first-order structural transitions between square lattices where vortices are pinned with their cores on plaquettes/sites. We discuss connections between these vortex structures and the Hofstadter butterfly spectrum of free particles on a rotating lattice. We also investigate vortex configurations in a harmonic trap, where superfluid and Mott phases can coexist in a shell structure.

[1] D. Goldbaum and E. Mueller, *Vortex lattices of bosons in deep rotating lattices*, arXiv.org:0710.1090 (2007).

¹This material is based upon work supported by the National Science Foundation under grant PHY-0456261.

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Date submitted: 25 Nov 2007

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