Abstract Submitted
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Vortices near the Mott phase of a trapped Bose-Einstein condensate¹ DANIEL GOLDBAUM, ERICH MUELLER, Cornell University —
We present a theoretical study of vortices within a harmonically trapped Bose-
Einstein condensate in a rotating optical lattice. We find that proximity to the
Mott insulating state dramatically affects the vortex structures. To illustrate we
give examples in which the vortices: (i) all sit at a fixed distance from the center of
the trap, forming a ring, or (ii) coalesce at the center of the trap, forming a giant
vortex. We model the imaging of these structures by calculating time-of-flight col-
umn densities. As in the absence of the optical lattice, the vortices are much more
easily observed in a time-of-flight image than in-situ.

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Daniel Goldbaum
Cornell University

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