Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Rotating $SU(2)$ Bose-Einstein condensates[1] PEDER GALTELAND, ASLE SUDBO, Norwegian University of Science and Technology — The topological excitations inherent in Bose-Einstein condensates are important elements of both superconductors and superfluids, and are even relevant in cosmology and high energy physics. Condensates with multiple components and intercomponent couplings open up new possibilities for novel vortex physics, and which have been studied numerically and realized experimentally. We have studied a uniformly frustrated 2-component Ginzburg-Landau theory with amplitude fluctuations and density-density interactions included, through the use of Metropolis Monte Carlo techniques. We have explored the ground states as a function of rotational frequency, and inter- and intra-component coupling strength. It was found that the model exhibits both hexagonal lattices of co-centered vortices, and square lattices of interpenetrating vortices. These lattices exhibit a first order melting transition. The special case of an $SU(2)$ symmetric potential was also explored. With this additional symmetry, dimer vortex configurations, strong staggering of the amplitude fields and massive degeneracy of the ground states appear.

[1]This work was supported by the Norwegian Research Council and the Norwegian Consortium for High-Performance Computing

Asle Sudbo
Norwegian University of Science and Technology

Date submitted: 15 Nov 2013 Electronic form version 1.4