Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Gauge fields and superfluid dynamics of ultracold atoms[1] BENJAMIN SMITH, LOGAN COOKE, ARINA TASHCHILINA, LINDSAY LEBLANC, University of Alberta — Using the toolbox of ultracold quantum gases, we study the effects of Abelian gauge fields which possess a simultaneous time- and spatially-dependent character. GPU-accelerated numerics allow us to investigate the real-time dynamics of the Gross-Pitaevskii equation, subject to these unique vector potentials. In certain parameter regimes, we observe not only vortex nucleation, but also vortex precession around the condensate. We also report recent progress towards experimental quantum simulation of Abelian and non-Abelian gauge potentials in a ^{87}Rb Bose-Einstein condensate.

[1]We gratefully acknowledge the support of NVIDIA Corporation with the donation of the Titan V GPU used for this research.

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Date submitted: 31 Jan 2020 Electronic form version 1.4