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Rashba Spin-Orbit Coupled Bose-Einstein Condensates with Magnetic Dipole-Dipole Interactions RYAN WILSON, BRANDON ANDERSON, CHARLES CLARK, Joint Quantum Institute, National Institute of Standards and Technology and University of Maryland, Gaithersburg, MD 20899, USA — In this talk we consider the effect of Rashba spin-orbit coupling on a quasi-two dimensional Bose-Einstein Condensate with dipolar interactions. The interplay of the spin-orbit coupling, which favors textured and vortex-antivortex lattice ground states, and the dipole-dipole interaction, which introduces non-local spin-exchange processes and a strongly geometry-dependent interaction character, leads to a variety of novel ground states including combinations of spin and purely motional vortices. With the assistance of a numerical Bogoliubov-de Gennes analysis, we map the relevant phase boundaries, thereby characterizing the rich ground-state phase diagram of this system.

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