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Topological Excitations in Spin-2 BECs¹ ALINA BLINOVA, Amherst College, TUOMAS OLLIKAINEN, MIKKO MÖTTÖNEN, Aalto University, DAVID HALL, Amherst College — Spinor Bose-Einstein condensates (BECs) support a variety of magnetic phases that break the symmetry of the full interaction Hamiltonian. The different broken symmetries of the order parameter permit a wide variety of topological excitations that extend beyond the familiar quantized vortices. For example, in spin-1 condensates the symmetry of the ferromagnetic phase supports skyrmions, whereas the polar magnetic phase supports both knots and monopoles. While spin-1 BECs have recently received considerable attention, topological excitations in spin-2 condensates remain largely unexplored. Here we report the successful experimental realization of knots, monopoles and vortices in the uniaxial nematic and ferromagnetic phases of a spin-2 ^{87}Rb BEC, as well as in the $F=1$ and $F=2$ superposition. Our experiments serve as the starting point in the experimental study of exotic excitations within the rich landscape of these magnetic phases.

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Alina Blinova
Amherst College

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