

Abstract Submitted
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Non-Abelian and 1/3 Fractional Vortices in Spin-2 Bose-Einstein condensates AZURE HANSEN, JUSTIN T. SCHULTZ, NICHOLAS P. BIGELOW, University of Rochester — We present the creation of non-Abelian and 1/3 fractional vortices in a Bose-Einstein condensate by a multi-step stimulated optical Raman interaction that relies on beams carrying orbital angular momentum. The spin-2 manifold of ^{87}Rb supports complex topological structures due to the symmetry of the spinor wavefunction. A wavefunction that has a tetrahedral symmetry is especially interesting as multi-component coreless vortices have 1/3 and 2/3 fractional topological charge. Such vortices are non-Abelian in nature, a property that manifests in their collision dynamics. Additionally, this spin texture corresponds to the configuration of the cyclic phase, which has neither ferromagnetic nor antiferromagnetic interactions. By observing the temporal evolution of these spin textures we can determine the ground state nature of spin-2 ^{87}Rb .

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