

Abstract Submitted  
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**Core structure and dynamics of non-Abelian vortices in a biaxial nematic spinor Bose-Einstein condensate**<sup>1</sup> MAGNUS O. BORGH, JANNE RUOSTEKOSKI, University of Southampton — We demonstrate that multiple interaction-dependent defect core structures as well as dynamics of *non-Abelian* vortices can be realized in the biaxial nematic (BN) phase of a spin-2 atomic Bose-Einstein condensate (BEC). An experimentally simple protocol may be used to break degeneracy with the uniaxial nematic phase. We show that a discrete *spin-space symmetry* in the core may be reflected in a breaking of its *spatial symmetry*. The discrete symmetry of the BN order parameter leads to non-commuting vortex charges. We numerically simulate reconnection of non-Abelian vortices, demonstrating formation of the obligatory *rung vortex*. In addition to atomic BECs, non-Abelian vortices are theorized in, e.g., liquid crystals and cosmic strings. Our results suggest the BN spin-2 BEC as a prime candidate for their realization.

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