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Asymmetric spatial structure of zero modes for birefringent Dirac fermions[1] MALCOLM P. KENNETT, Simon Fraser University, BITAN ROY, NHMFL, Florida State University, PETER M. SMITH, Simon Fraser University — We study the zero energy modes that arise in an unusual vortex configuration involving both the kinetic energy and an appropriate mass term in a model which exhibits birefringent Dirac fermions as its low energy excitations. We find the surprising feature that the ratio of the length scales associated with states centered on vortex and anti-vortex topological defects can be arbitrarily varied but that fractionalization of quantum numbers such as charge is unaffected. We discuss this situation from a symmetry point of view and present numerical results for a specific lattice model realization of this scenario.

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Malcolm P. Kennett
Simon Fraser University

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