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Domain walls and non-integral flux penetration in superconductors having broken time-reversal symmetry DAVID GEORGE FERGUSON, PAUL GOLDBART, University of Illinois at Urbana-Champaign — Sr_2RuO_4 is a candidate material for realizing superconductivity that spontaneously breaks time-reversal symmetry [1]. If this symmetry is in fact broken then the spatial pattern of the superconductivity may break up into domains that differ in their chirality, separated by domain walls. A consistent picture of how, where, or whether such domain walls form in Sr_2RuO_4 has, however, yet to emerge [2]. It has been predicted that, owing to in-plane crystalline anisotropy, a domain wall may catalyze the dissociation of a unit-flux vortex (measured in units of the superconducting flux quantum Φ_0) into two fractional-flux vortices, the fluxes of which sum to unity [3]. In the present work, we consider a domain wall in which there is a relatively sharp bend through an angle Θ. We show that, even in the absence of crystalline anisotropy, such a wall is penetrated by a magnetic field localized to the vicinity of the bend, of total, non-quantized flux $\Phi_0\Theta/\pi$. (Anisotropy, weak in Sr_2RuO_4, gives a small correction to this result.) The observation of localized regions carrying non-integer flux would provide evidence for domain walls separating chiral domains of superconductivity.
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