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Fractional Vortices in Multi-Gap Superconductors YEN LEE LOH, MONICA KIM, JU H. KIM, University of North Dakota — Novel topological defects, known as fractional vortices, can occur in thin films of multi-gap superconductors. We study two-gap and three-gap superconducting films within a classical Ginzburg-Landau description, using numerical simulations and analytic approximations. In two-gap superconducting films, we find that the interband Josephson coupling J_{12} leads to an effective attraction between half-vortices, whereas the permeability parameter μ leads to an effective repulsion between half-vortices. We locate the phase boundary in (J_{12}, μ) space that marks the onset of spontaneous vortex fractionalization. We describe how the size of a fractional vortex increases as one goes deeper into the fractionalized phase. Our results suggest that coating a multi-gap superconducting film with a paramagnetic overlayer will enhance the tendency towards vortex fractionalization.

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