

Abstract Submitted
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Collective modes in non-uniform superconductors ANTON VORONTSOV, ANDREW HAMMER, Montana State University — We study dynamics of a superconducting condensate in the presence of a domain wall defect in the order parameter. We find that broken translation and reflection symmetries result in new collective excitations, bound to the domain wall region. Two additional amplitude/Higgs modes lie below the bulk pairbreaking edge 2Δ ; one of them is a Goldstone mode with vanishing excitation energy. Spectrum of bound collective modes is related to the topological structure and stability of the domain wall. The ‘unbound’ bulk collective modes and transverse gauge field mostly propagate across the domain wall, but the longitudinal component of the gauge field is completely reflected. Softening of the amplitude mode suggests reduced damping and possible route to its detection in geometrically confined superfluids or in superconductor-ferromagnetic heterostructures.

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