

Abstract Submitted  
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**Type-1.5 superconductivity in multiband systems: the effects of interband couplings**<sup>1</sup> EGOR BABAEV, UMass Amherst and KTH Stockholm, JOHAN CARLSTROM, KTH Stockholm, MARTIN SPEIGHT, University of Leeds — Two-component superconductors can possess a “type-1.5” state which falls outside the usual type-I/type-II dichotomy. In this regime two vortices attract one another at long range but repel at shorter ranges. Multiple vortices thus should form clusters in cases where their interaction could be approximately described by a superposition of such nonmonotonic two-body forces and one can define a negative interface energy inside a cluster and at the same time one can define a positive interface energy associated with the cluster’s boundary. We describe the appearance of type-1.5 regimes in the case of two bands with various kinds of substantial interband couplings such as Josephson coupling, mixed gradient coupling and density-density interactions. We show that in these cases the system supports type-1.5 superconductivity with fundamental length scales being associated with the mass of the gauge field and two masses of normal modes represented by mixed combinations of the density fields. Talk based on arXiv:1009.2196 and Phys. Rev. Lett. 105, 067003 (2010)

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