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Vortex coalescence and type-1.5 superconductivity in Sr2RuO4[1]

EGOR BABAEV, University of Massachusetts Amherst and KTH Stockholm, JULIEN GARAUD, University of Massachusetts Amherst , DANIEL AGTERBERG, University of Wisconsin-Milwaukee — Recently vortex coalescence was reported in superconducting Sr2RuO4 by several experimental groups for fields applied along the c-axis. We argue that Sr2RuO4 is a type-1.5 superconductor with long-range attractive, short-range repulsive intervortex interaction. The type-1.5 behavior stems from an interplay of the two orbital degrees of freedom describing this chiral superconductor together with the multiband nature of the superconductivity. These multiple degrees of freedom give rise to multiple coherence lengths, some of which are larger and some smaller than the magnetic field penetration length, resulting in nonmonotonic intervortex forces. The talk is based on Phys. Rev. B 86, 060513(R) (2012)

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