

Abstract Submitted
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Broken time-reversal symmetry in a vortex phase of a superconductor under perpendicular magnetic field. OMJYOTI DUTTA, ANDREI LEBED, Dept. of Physics, University of Arizona — A vortex phase in a singlet superconductor is absolutely unstable with respect to a generation of a triplet component of a superconducting order parameter. The triplet component, which appears for both attractive and repulsive interactions in a triplet channel, breaks spin-rotational and parity symmetries[1]. Here we show[2] that in a perpendicular magnetic field, in addition to the above mentioned symmetries, the order parameter also breaks time reversal symmetry. As a result, Cooper pairs carry non-zero angular momenta. The above mentioned effects are expected to be of the order of unity in almost all modern superconductors such as high-Tc and organic ones. We suggest experimental studies to discover triplet-singlet mixing phenomenon which characterizes this novel type-IV superconductivity. [1] A. G. Lebed, Phys. Rev. Lett. 96, 037002. [2]O. Dutta and A. G. Lebed, Nature, submitted (2006)

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