Conduction Electron Spin Resonance in the Superconducting State of K_3C_{60}

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Conduction electron spin resonance (CESR) in the superconducting state of K_3C_{60} and Rb_3C_{60} was measured at several magnetic fields. The spin lifetime of normal excitations below T_c increases as predicted by the zero-field theory of Yafet for scattering from non-magnetic structural defects (Y. Yafet, Phys. Lett. **98**, 287 (1983)). However, at finite magnetic fields at low temperatures the CESR comes from electrons bound to vortices, so a different behaviour is expected. To account for geometrical effects (ie. demagnetization and inhomogeneous broadening), several powder, single crystal and thin film samples were measured. The zero-field theory of Yafet predicts that the relaxation rate and thus the CESR linewidth goes to zero as the temperature approaches zero while it is expected that normal excitations bound to vortices relax similar to that in the normal state with a non-zero relaxation rate. The results of experiments in finite magnetic fields can be described by a model where the electrons diffuse in and out of the vortex-core. However, the relaxation rate does not grow back to the normal state value even at the lowest measured temperatures.