Abstract Submitted
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Low magnetic field microwave absorption and ESR studies of coexisting superconductivity and ferromagnetism in Eu-based pnictides[1] AUSTIN HOWARD, Nanotech Institute, University of Texas at Dallas, TIAN SHANG, JIAOWEN HE, GUANGHAN CAO, HUIQUI YUAN, Zhejiang University, MYRON SALAMON, ANVAR ZAKHIDOV, Nanotech Institute, University of Texas at Dallas —
We have studied the coexistence of FM ordering and SC in the doped pnictide $EuFe_2(As_{1-x}P_x)_2$ system, with doping levels of $x = 0.3$ and 0.27, by combined ESR and non-resonant low field microwave absorption (LFMA) methods, and magnetization in SQUID. LFMA uses an external magnetic field to create vortices in the material, which are non-resonantly excited by MW radiation. The resulting spectrum's hysteresis shape and form changes with T, revealing transitions around 9 and 20 K, and showing the FM onset and SC T_c. Two types of coexisting LFMA signals have been observed: a) a superconducting hysteretic LFMA loop, appearing below T_c and changing its shape, phase and intensity with T, and b) the non-hysteretic, reversed phase LFMA, above SC T_c, which is assigned to the magnetically ordered ferromagnetic phase, since it does not depend on T. Additionally, in the $x = 0.27$ sample, a reemergence of hysteresis is seen near 18K, corresponding with the reentrant superconductivity observed in transport measurements. LFMA has also been used to determine the position of the irreversibility line and to estimate the critical current density for the two samples.

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