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Giant proximity effect and critical opalescence in EuS TIMOTHY CHARLTON, Rutherford Appleton Laboratory, Science and Technology Facilities Council, United Kingdom., SILVIA RAMOS, JORGE QUINTANILLA, School of Physical Sciences, University of Kent, Canterbury, Kent, United Kingdom., ANDREAS SUTER, Paul Sherrer Institut, Switzerland, JAGADEESH MOODERA, Francis Bitter Magnet Laboratory, Massachusetts Institute of Technology, Cambridge, MA, United States. — The proximity effect is a type of wetting phenomenon where an ordered state, usually magnetism or superconductivity, "leaks" from one material into an adjacent one over some finite distance. For superconductors, the characteristic range is of the order of the coherence length, usually hundreds of nm. Nevertheless much longer, "giant" proximity effects have been observed in cuprate perovskite junctions. Such giant proximity effects can be understood by taking into account the divergence of the pairing susceptibility in the non-superconducting material when it is itself close to a superconducting instability: a superconducting version of critical opalescence. Since critical opalescence occurs in all second order phase transitions, giant proximity effects are expected to be general, therefor there must be a giant ferromagnetic proximity effect. Compared to its superconducting counterpart, the giant ferromagnetic proximity effect has the advantage that the order parameter (magnetization) can be observed directly. We have fabricated Co/EuS thin films and measured the magnetization profiles as a function of temperature using the complementary techniques of low energy muon relaxation and polarized neutron reflectivity. Details of the proximity effect near T_C^{EuS} will be presented.

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