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Giant proximity effect in ferromagnetic bilayers[1] SILVIA RAMOS, Diamond Light Source, Harwell Science and Innovation Campus, U.K., TIM CHARLTON, ISIS, STFC RAL, U.K., JORGE QUINTANILLA, U. of Kent and ISIS, STFC RAL, U.K., ANDREAS SUTER, PSI, Switzerland, JAGADEESH MOODERA, Francis Bitter Magnet Lab and Physics Department, MIT, Cambridge, MA, THOMAS PROKSCHA, ZAHER SALMAN, PSI, Switzerland, TED FORGAN, U. of Birmingham, U.K. — The proximity effect is a phenomenon where an ordered state leaks from a material into an adjacent one over some finite distance, ξ. For superconductors, this distance is $\sim$ the coherence length. Nevertheless much longer-range, "giant" proximity effects have been observed in cuprate junctions. This surprising effect can be understood as a consequence of critical opalescence. Since this occurs near all second order phase transitions, giant proximity effects should be very general and, in particular, they should be present in magnetic systems. The ferromagnetic proximity effect has the advantage that its order parameter (magnetization) can be observed directly. We investigate the above phenomenon in Co/EuS bilayer films, where both materials undergo ferromagnetic transitions but at rather different temperatures (bulk T_C of 1400K for Co and 16.6K for EuS). A dramatic increase in the range of the proximity effect is expected near the T_C of EuS. We present the results of our measurements of the magnetization profiles as a function of temperature, carried out using the complementary techniques of low energy muon rotation and polarized neutron reflectivity.

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