Search for Magnetic Order in Superconducting RuSr$_2$Eu$_{1.2}$Ce$_{0.8}$Cu$_2$O$_{10}$

J. W. LYNN, Y. CHEN, NIST Center for Neutron Research, Gaithersburg, MD 20899-8562 and U. Maryland, S.K. GOH, G.V.M. WILLIAMS, MacDiarmid Institute for Advanced Materials, Industrial Research, POB 31310, Lower Hutt, New Zealand — Neutron diffraction, polarized neutron transmission, and small angle neutron scattering have been used to investigate the nature of the magnetic order in the titled compound. The sample was made with the Eu-153 (98.8%) isotope to reduce the high neutron absorption for this element. At low T a single magnetic peak is clearly observed. A sharp spin reorientation transition (SRT) is observed around 35 K, close to the superconducting transition temperature (Tc 40K). Between the SRT and the Neel temperature of 59 K, additional magnetic reflections are observed. However, none of these can be simply indexed on the chemical unit cell, either as commensurate peaks or simple incommensurate magnetism, and the paucity of reflections at low T compels the conclusion that these arise from an impurity phase. X-ray and neutron diffraction both show that the sample does not appear to contain significant impurity phases. However, the impurity peaks exhibit strong preferred orientation, while the primary phase does not. We have been unable to observe any magnetic order that can be identified with the ruthenate-cuprate system. Additional field-dependent results will be discussed.