Abstract Submitted
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$SrEr_2O_4$ in an applied magnetic field –a quantum phase transition? O.A. PETRENKO, G. BALAKRISHNAN, T.J. HAYES, University of Warwick, UK, P. MANUEL, D.T. ADROJA, L.C. CHAPON, ISIS, RAL, UK — $SrEr_2O_4$ belongs to a family of materials with the formula $SrLn_2O_4$, where Ln = Gd, Dy, Ho, Er, Tm and Yb. In these compounds the magnetic Ln ions are linked through a network of triangles and hexagons [1]. Despite the strong exchange interaction ($\Theta_{CW} \approx -12$ K), long range ordering develops in $SrEr_2O_4$ only at 0.75 K [2]. The structure consists of FM chains running along the c axis, two adjacent chains being stacked antiferromagnetically. The moments point along the c direction, but only one of the two Er sites has a sizeable moment of 4.5 μ_B. An unusual behaviour in $SrEr_2O_4$ is observed in an applied field, where for $H \parallel c$ axis, a field of 0.5 T completely destroys long range magnetic order and introduces instead some sort of state with short range magnetic correlations. This conclusion is reached on the basis of neutron diffraction experiment at ISIS, where a replacement of the sharp Bragg peaks by broad diffuse scattering features is observed. A further increase in magnetic field causes a restoration of the long range order and a disappearance of the diffuse scattering. These observations resemble the behaviour seen around a quantum critical phase transition, although additional investigations are required to prove the presence of a QCP in $SrEr_2O_4$. [1]. H. Karunadasa *et al.*, Phys. Rev. B **71**, 144414 (2005). [2]. O.A. Petrenko *et al.*, Phys. Rev. B **78**, 184410 (2008).

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