Abstract Submitted
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Magnetic excitations in spin-orbital liquid $FeSc_2S_4$ in zero and applied magnetic field probed by inelastic neutron scattering[1] ALUN BIFFIN, RADU COLDEA, University of Oxford, CHRISTIAN RÜEGG, OKSANA ZAHARKO, JAN EMBS, Paul Scherrer Institut, TATIANA GUIDI, ISIS at Rutherford Appleton Laboratory, VLADIMIR TSURKAN, Universität Augburg — In systems where both spin and orbital frustration are present, an intriguing Spin Orbital Liquid (SOL) state is believed to occur where spin and orbital moments remain disordered down to the lowest measurable temperatures. The A-site spinel $FeSc_2S_4$ is believed to form such a SOL ground state, with its undistorted cubic structure and diamond lattice of Fe^{2+} sites providing the ingredients for orbital and spin frustration, respectively. The system displays Curie-Weiss behaviour indicative of strong exchange between $S = 2$, $L = 2$ Fe^{2+} ions, though it does not order down to the lowest measurable temperatures. Here I will present the results of inelastic, time-of-flight neutron scattering experiments that probe the full bandwidth of the magnetic excitations in a powder sample of $FeSc_2S_4$, and provide a consistent model of the observed dynamics in terms of spin-orbital excitations, in both zero-field and in-field measurements. I will discuss in particular how the application of a magnetic field elucidates the spin and orbital nature of these excitations, as the system shows behaviour drastically contrary to its spin-only analogue.

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