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Evidence for $SrHo_2O_4$ and $SrDy_2O_4$ as model 1D J_1-J_2 zig-zag chain materials AMY POOLE, VLADIMIR POMJAKUSHIN, ANNE-CHRISTINE ULDRY, Paul Scherrer Institute, Switzerland, BOBBY PREVOST, ALEXANDRE DESILETS-BENOIT, ANDREA BIANCHI, Universite de Montreal, Montreal, Quebec, Canada, BRITT HANSEN, Dept of Physics, Technical University of Denmark, Denmark, ROBERT CAVA, Princeton University, Princeton, USA, MICHEL KENZELMANN, Paul Scherrer Institute, Switzerland — This presentation will focus on the Ho and Dy members of the recently discovered SrR_2O_4 family of frustrated rare-earth (R) materials. Despite the R sites forming a honeycomb in the *ab* plane, we demonstrate that the physics is dominated by 1D correlations in the c-direction and that these can be mapped onto the Ising J_1-J_2 spin chain model. Three-dimensional magnetic order is suppressed from θ_w = -16.9 K to T_N = 0.66 K in $SrHo_2O_4$ and is not observed to 50 mK in $SrDy_2O_4$. Our neutron powder diffraction measurements indicate that prior to the 3D order in the $SrHo_2O_4$ compound a 1D magnetically correlated state exists and that a similar state is found at the lowest measured temperatures in $SrDy_2O_4$. Fits to the diffuse data allow us to identify the 1D nature of the material and the key structural motifs are found from the data collected in the long-range ordered phase of $SrHo_2O_4$. Point charge calculations are fitted to the inelastic neutron scattering data and identify a large Ising anisotropy. The combination of neutron scattering and novel modelling techniques has allowed us to unambiguously determine the magnetic structure, identify the key interactions in the system and understand the 1D nature of the system.

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