Abstract Submitted
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Excitations and long-range-order in a crystalline ferromagnetic semiconductor[1] MATTHEW STONE, VASILE GARLEA, Quantum Condensed Matter Division, Oak Ridge National Laboratory, BEATRICE GILLON, ALAIN COUSSON, Laboratoire Leon Brillouin, ANDREW CHRISTIANSON, MARK LUMSDEN, STEPHEN NAGLER, Quantum Condensed Matter Division, Oak Ridge National Laboratory, DAVID MANDRUS, Department of Materials Science and Engineering, University of Tennessee, BRIAN SALES, Materials Science and Technology Division, Oak Ridge National Laboratory — We present polarized and unpolarized neutron diffraction measurements as well as inelastic neutron scattering measurements examining the dilute ferromagnetic semiconductor $Yb_{14}MnSb_{11}$. We find that the system consists of RKKY ferromagnetic exchange coupled Mn^{2+} sites with nearest and next nearest neighbor exchange interactions dominating the magnetic spectrum. We observe a distribution of negative magnetization density throughout the crystal structure with no significant negative magnetization on any single site. The extended spread of a negative magnetization around each of the Mn ions supports a Kondo screening cloud scenario for $Yb_{14}MnSb_{11}$.

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