

Abstract Submitted
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Neutron spectroscopic study of Crystal-field excitation in $Yb_2(Ti_{2-x}Yb_x)O_{7-\frac{x}{2}}$ JONATHAN GAUDET, DALINI MAHARAJ, EDWIN KERMARREC, McMaster University, GARRETT GRANROTH, Oak Ridge National Lab, KATE ROSS, John Hopkins University, HANNA DABOWSKA, BRUCE GAULIN, McMaster University — Among the rare-earth titanate pyrochlores, $Yb_2Ti_2O_7$ has attracted much attention as a potential realization of a quantum spin ice [1]. While strong quantum effects are absent in classical spin ice compounds, they are thought to be significant in $Yb_2Ti_2O_7$ because of its effective spin $S=1/2$ and its XY spin anisotropy, quantities both determined by the Crystal-Electric Field (CEF) levels. However, a thorough neutron spectroscopy study of the CEF levels is still lacking. Here, we report time-of-flight inelastic neutron scattering measurements on $Yb_2Ti_2O_7$. Our results lead to the unambiguous determination of the CEF levels, the ground-state wavefunction and therefore the nature of the spin anisotropy of the $J=7/2 Yb^{3+}$. A significant sample dependence in the low temperature heat capacity has been reported and attributed to an excess of Yb^{3+} ("stuffing") in the structure [2]. Our measurements, carried out on two well-characterized samples with different levels of stuffing, allow us to discuss the impact of such disorder on the CEF levels. [1] K.A. Ross, L. Savary, B.D. Gaulin, L. Balents, Physical Review X, 1(2), 021002, (2011). [2] K.A. Ross, Th. Proffen, H.A. Dabkowska, J.A. Quilliam, L.R. Yaraskavitch, J.B. Kycia and B.D. Gaulin, Phys. Rev. B 86, 17442

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