

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Cross-tunneling and phonon bottleneck effects in the relaxation phenomena of the XY pyrochlore antiferromagnet $\text{Er}_2\text{Ti}_2\text{O}_7$.¹ MARTIN ORENDÁČ, P. J. Šafárik University, Košice, Slovak republic, KATARÍNA TIBENSKÁ, Technical University, Košice, Slovak Republic, JOZEF STREČKA, JANA ČISÁROVÁ, VLADIMÍR TKÁČ, ALŽBETA ORENDÁČOVÁ, ERIK ČIŽMÁR, P. J. Šafárik University, Košice, Slovak republic, JAN PROKLEŠKA, VLADIMÍR SECHOVSKÝ, Faculty of Mathematics and Physics, Charles University, Prague, Czech Republic — Multiple time-scale relaxation dynamics are revealed by alternating-current (ac) susceptibility measurements of a single crystal of $\text{Er}_2\text{Ti}_2\text{O}_7$ studied at high temperatures ($k_B T \gg J/k_B$) and in a wide-range of static magnetic fields. The analysis of the frequency dependence of the ac susceptibility revealed the existence of two relaxation mechanisms identified as an Orbach process with a pronounced effect of phonon bottleneck and cross-tunneling. The origin of the phonon bottleneck is attributed to a resonant phonon trapping. The relevance of the obtained results for relaxation phenomena found in other rare-earth pyrochlores, studied under similar conditions, is discussed.

¹The work was supported by projects APVV-14-0073 and ITMS 26220120005

Martin Orendáč
P. J. Šafárik University, Park Angelinum 9, 041 54 Košice, Slovak republic

Date submitted: 04 Nov 2015

Electronic form version 1.4