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**Antiferromagnetic order in the pyrochlores  $R_2Ge_2O_7$  ( $R = Er, Yb$ )** ZHILING DUN, Univ. of Tennessee, Knoxville, XIANG LI, Beijing National Laboratory for Condensed Matter Physics, RAFAEL FREITAS, EVERTON ARRIGHI, Instituto de Fisica, Universidade de Sao Paulo, Brazil, CLARINA CRUZ, Oak Ridge National Laboratory, MINSEONG LEE, EUN SANG CHOI, Florida State University and NHMFL, HUIBO CAO, Oak Ridge National Laboratory, HARLYN SILVERSTEIN, University of Manitoba, CHRIS WIEBE, Florida State University and NHMFL, University of Manitoba, University of Winnipeg, Canadian Institute for Advanced Research, JINGUANG CHEN, Beijing National Laboratory for Condensed Matter Physics, HAIDONG ZHOU, Univ. of Tennessee and NHMFL — Elastic neutron scattering, ac susceptibility, and specific heat experiments on the pyrochlores  $Er_2Ge_2O_7$  and  $Yb_2Ge_2O_7$  show that both systems are antiferromagnetically ordered in the  $\Gamma_5$  manifold. The ground state is a  $\psi_3$  phase for the Er sample and a  $\psi_2$  or  $\psi_3$  phase for the Yb sample, which suggests “Order by Disorder” (ObD) physics. Furthermore, we unify the various magnetic ground states of all known  $R_2X_2O_7$  ( $R = Er, Yb, X = Sn, Ti, Ge$ ) compounds through the enlarged XY type exchange interaction  $J_{\pm}$  under chemical pressure. The mechanism for this evolution is discussed in terms of the phase diagram proposed in the theoretical study [Wong et al., Phys. Rev. B 88, 144402, (2013)].

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