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Magnetic phase competition in the XY pyrochlore $Er_2Sn_2O_7$ DANIELLE YAHNE, Colorado State University, L. D. C. JAUBERT, University of Bordeaux, L. D. SANJEEWA, Oak Ridge National Laboratory, J. W. KOLIS, Clemson University, D. PEREIRA, University of Waterloo, M. ENJALRAN, Southern Connecticut State University, M. J. P. GINGRAS, University of Waterloo, K. A. ROSS, Colorado State University — XY pyrochlores ($[Yb/Er]_2M_2O_7$, where M is the non-magnetic site) have attracted interest due to their rich phase diagram. $Er_2Sn_2O_7$ lies near a phase boundary in exchange parameter space, resulting in a competition between classically ordered phases. It undergoes a phase transition into a magnetically ordered "Palmer-Chalker" state at a lower temperature than Monte-Carlo simulations predict based on available estimates of the exchange interactions. The suppression of this transition temperature has been attributed to quantum fluctuations arising from the phase competition, but details of the energetics and resulting phase behavior were previously unknown. We report on magnetic field dependent specific heat measurements on $Er_2Sn_2O_7$, as well as Monte-Carlo simulations and mean field theory calculations on the relevant model, which offer clear insights into the details of this phase competition. Above a threshold field value of 0.2 T, we find a reentrant phase diagram, which compares well qualitatively with classical Monte Carlo simulations. Differences between classical simulations and experiments at low field provide further evidence of strong quantum fluctuations in $Er_2Sn_2O_7$, suggesting its proximity to a quantum disordered regime such as a quantum spin liquid.

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