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Competing order in spin ice PATRIK HENELIUS, KTH, TAORAN LIN, ZHIHAO HAO, MICHEL GINGRAS, University of Waterloo — The spin ice family of materials is one of the foremost realizations of a frustrated system displaying a macroscopic ground state degeneracy down to very low temperatures. With the strongest interactions frustrated, small perturbations may eventually cause non-trivial and exotic ordering, which would be hidden in an unfrustrated system. In this study we find that $Dy_2Ti_2O_7$, a member of the spin ice family, is a prime example of this phenomenology. The value of the weak third neighbor interaction determines which ordered state is eventually selected. We calculate the phase diagram and explore the implications of recent zero-field specific heat measurements and previous neutron scattering data.

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