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LiHo_xY_{1-x}F₄ and the quantum Ising spin glass MOSHE SCHECHTER, Department of Physics and Astronomy, University of British Columbia, PHILIP STAMP, NICOLAS LAFLORENCIE — *LiHo_xY_{1-x}F₄* in transverse field is considered to be the experimental realization of the transverse field Ising model, and a main tool in the study of quantum magnetism. For different values of x , ranging from 1 to 10^{-3} , the system exhibits ferromagnetism, spin glass order, single large spin tunneling and various other interesting phenomena. Here we consider the spin glass regime, and in particular address two long standing puzzles posed by the experiments, i.e. the large disordering transverse field and the diminishing of the cusp in the nonlinear susceptibility as temperature is decreased. The solution of these puzzles emphasizes the significance of the hyperfine and offdiagonal dipolar interactions in this system. We then show that the latter destroys the spin glass order at any finite transverse field in this system, as well as in a general dipolar Ising spin glass. The nature of the disordering of the spin glass phase by quantum fluctuations will be discussed.

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