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**Low Temperature Spin Structure of Gadolinium Titanate** BEHNAM JAVANPARAST, PAUL MCCLARTY, MICHEL GINGRAS, University of Waterloo — Many rare earth pyrochlore oxides exhibit exotic spin configurations at low temperatures due to frustration. The nearest neighbor coupling between spins on the corner-sharing tetrahedral network generate geometrical magnetic frustration. Among these materials, gadolinium titanate (Gd2Ti2O7) is of particular interest. Its low temperature ordered phases are not yet understood theoretically. Bulk thermal measurements such as specific heat and magnetic susceptibility measurements find two phase transitions in zero external field, in agreement with simple mean field calculations. However, recent neutron scattering experiments suggest a so-called 4-k spin structure for intermediate phase and a so called canted 4-k structure for lower temperature phase that does not agree with either mean-field theory or Monte Carlo simulation which find the 1-k state and Palmer-Chalker state respectively as the lowest free energy configuration for those phases. In our work, we study the 4-k structure in detail and present a new phase diagram for dipolar Heisenberg spins on a pyrochlore lattice, certain portions of which describe gadolinium titanate.

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