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Effective spin-1/2 exchange model for $Tb_2Ti_2O_7$: beyond the independent tetrahedra approximation[1] SOUMYA MUKHERJEE, STEPHANIE CURNOE, Memorial University of Newfoundland — In the pyrochlore crystal terbium titanate ($Tb_2Ti_2O_7$) the magnetic Tb^{3+} ions form a network of corner-sharing tetrahedra. The edges of the tetrahedra are nearest-neighbour exchange paths. The tetrahedra occur in two different orientations, therefore they can be divided into two sets. The independent tetrahedra approximation includes exchange interactions on only one set of tetrahedra and neglects interactions on the other. Although this approach can reproduce the main features of diffuse neutron scattering intensity patterns, it cannot describe any long range effects. In this work we look beyond the independent tetrahedra approximation by considering exchange paths on both sets of tetrahedra. Second order perturbation theory is used to find an effective spin-1/2 exchange model for $Tb_2Ti_2O_7$.

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