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Field induced magnetic ordering and spin excitations in the frustrated pyrochlore Antiferromagnet $Tb_2Ti_2O_7$ K.C. RULE, B.D. GAULIN, S.R. DUNSIGER, J.C. RUFF, Department of Physics and Astronomy, McMaster University, Hamilton Ontario, Canada L8S4M1, J.S. GARDNER, Physics Department, Brookhaven National Laboratory, Upton, NY 11973-5000, USA, Y QIU, J.R.D COPLEY, NIST Center for Neutron Research, National Institute of Standards and Technology, Gaithersburg, MD 20899-8562, USA — $Tb_2Ti_2O_7$ is a rare earth titanate which is characterized by antiferromagnetically-coupled Tb moments on the geometrically frustrated pyrochlore lattice. However unlike other members of this family, $Tb_2Ti_2O_7$ displays no static magnetic order at temperatures down to 70mK[1]. Time-of-flight neutron scattering was performed on a single crystal of $Tb_2Ti_2O_7$ at the NIST Center for Neutron Research. Applied magnetic fields of up to 8.5T, directed along the <110> direction, induced two magnetically ordered states at T=1 K. This applied field clearly splits the degenerate excited state doublet, and induces a dispersive collective spin excitation which appears to go to zero energy at the 001 and, possibly, 003 zone centres. These results require continuous spin degrees of freedom to be relevant to the Tb moments. Modeling of the ordered phases will also be presented. [1]Gardner *et al.*, Phys. Rev. Lett. **82**,1012 (1999)

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