Induced Magnetic Order in Yb$_2$Ti$_2$O$_7$\textsuperscript{1} CARL ADAMS, St. Francis Xavier University, K.A. ROSS, J.P. RUFF, B.D. GAULIN, H. DABKOWSKA, McMaster University, Y. QIU, UMD/NIST Center for Neutron Research, J.R.D. COPLEY, J.S. GARDNER, NIST Center for Neutron Research — Yb$_2$Ti$_2$O$_7$ is part of family of pyrochlore materials with a magnetic rare-earth and a non-magnetic transition metal. In similar compounds containing holmium, erbium, or terbium the geometric frustration results in several exotic ground states including spin-ice, spin-liquid, field-induced ordering, and low-dimensional behavior. The ytterbium-based compound has a strong anomaly in the specific heat at 240 mK [Hodges \textit{et al.}, J Phys Cond Mat \textbf{13}, 9301 (2001)] but without accompanying long range order. We have made measurements of the elastic and inelastic neutron scattering on a large single crystal of Yb$_2$Ti$_2$O$_7$ over a broad range of the ($hhl$) scattering plane using the DCS spectrometer at the NIST Center for Neutron Research. Our studies have confirmed the presence of diffuse “rods” of scattering along the $(111)$ directions that persist below 100 mK. However, when the sample is field-cooled in fields as low as 0.5 T the rods of scattering are replaced by well-defined magnetic excitations. We will present the results of our studies at a variety of temperatures and fields.

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