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μSR Investigation of Superconducting $PbTaSe_2$ MURRAY WILSON, ALANNAH HALLAS, YIPENG CAI, Department of Physics and Astronomy, McMaster University, SHENGLI GUO, Department of Physics, Zhejiang University, ZIZHOU GONG, Department of Physics, Colombia University, MAZHAR ALI, ROBERT CAVA, Department of Chemistry, Princeton University, YASUTOMO UEMURA, Department of Physics, Colombia University, GRAEME LUKE, Department of Physics and Astronomy, McMaster University — Noncentrosymmetric superconductors are a topic of considerable interest in the condensed matter physics community. These materials have the potential to exhibit exotic superconducting states, particularly in the presence of strong spin orbit coupling. $PbTaSe_2$ is a noncentrosymmetric material which has very strong spin orbit coupling, and is superconducting with a T_C of 3.6 K. Previous studies of this material have identified exotic properties such as Dirac cones gapped by spin-orbit coupling [1], a topological semi-metal state, and possible multi-band superconductivity [2]. To further explore this material, it is of considerable interest to investigate the pairing symmetry of the superconducting state, and determine whether odd-parity superconductivity may exist. In this talk we will present a μSR investigation of the penetration depth temperature dependece to infer the pairing symmetry. We will also present zero field μSR measurements which suggest that this material has an even-parity superconducting state. [1] M.N. Ali et al. Physical Review B 69, 020505(R) (2014) [2] C.-L. Zhang et al. Physical Review B 93, 054520 (2016)

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