Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Electron Affinity of Thallium Measured with Infrared Laser Photodetachment Threshold Spectroscopy[1] C.W. WALTER, N.D. GIBSON, K.R. PATEL, S.E. SPIELMAN, Denison University — The electron affinity of thallium has been measured using tunable infrared laser photodetachment threshold spectroscopy. The relative cross section for neutral atom production following photodetachment from Tl^- was measured with a crossed laser–ion beam apparatus over the photon energy range 0.30 – 0.90 eV. An *s*-wave threshold was observed due to the opening of the Tl^- ($6p^2\ ^3P_0$) to Tl ($6p\ ^2P_{1/2}$) ground-state to ground-state transition, yielding a preliminary value for the electron affinity of thallium. No photodetachment signal was detected below this threshold and no other thresholds were observed over the present photon energy range, leading to the conclusion that the fine structure excited states of Tl^- are not bound. The present results are compared with previous experimental [1] and theoretical [2] studies of Tl^-.

[1] D. L. Carpenter, A. M. Covington, and J. S. Thompson, *Phys. Rev. A* **61**, 042501 (2000); [2] see for example J. Li, Z. Zhao, M. Andersson, X. Zhang, and C. Chen, *J. Phys. B-At. Mol. Opt. Phys.* **45**, 165004 (2012).

[1]This material is based on work supported by the National Science Foundation under Grant Nos. 1404109 and 1707743.

C.W. Walter
Denison University

Date submitted: 21 Jan 2019 Electronic form version 1.4