Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Experimental Measurements of the Electron Affinity of Gallium and the Fine Structure of Ga^{-1} N.D. GIBSON, C.W. WALTER, C.T. CROCKER, Denison University, J.N. YUKICH, Davidson College — The electron affinity of gallium and the negative ion fine structure splittings of Ga^- have been measured using tunable laser photodetachment threshold spectroscopy. The relative cross sections for neutral atom production were measured with a crossed laser-ion beam apparatus over the photon energy range 0.27 – 0.41 eV. An *s*-wave threshold was observed due to the opening of the Ga^- ($4p^2$ $^3P_0$) to Ga ($4p$ $^2P_{1/2}$) ground-state to ground-state transition, yielding a preliminary value for the Ga electron affinity. *s*-wave thresholds were also observed for detachment from the J = 1 and J = 2 excited levels of Ga^-, yielding preliminary values for the fine structure splittings. The present values are compared with previous experimental [1, 2] and theoretical results [3-5].

[1] W. W. Williams *et al.*, J. Phys. B **31**, L341 (1998);
[2] T. Andersen *et al.*, J. Phys. Chem. Ref. Data **28**, No. 6, 1511 (1999).
[3] D. Sundholm *et al.*, J. Phys. B **32,** 5853 (1999).
[4] J. Li *et al.*, J. Phys. B **45** 16500 (2012).
[5] Z. Felfli, *et al.*, J. Phys. B **45** 045201 (2012).

[1]This material is based on work supported by the National Science Foundation under Grant No. 1068308.

Nevin Gibson
Denison University

Date submitted: 31 Jan 2014 Electronic form version 1.4