

Abstract Submitted
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Experimental Measurements of the Electron Affinity of Gallium and Fine Structure of Ga^{-1} N.D. GIBSON, C.W. WALTER, C.T. CROCKER, W. NAKAYAMA, J. WANG, 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 $\text{Ga}^{-} (4p^2 \ ^3P_0)$ to $\text{Ga} (4p \ ^2P_{1/2})$ 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 value of the electron affinity, determined by tracking contributions from multiple channels, is found to be much lower than previous experimental results [1, 2] and is in better agreement with recent theory [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. Felfi, *et al.*, J. Phys. B **45** 045201 (2012).

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