Abstract Submitted
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Inner-shell photodetachment from O^{-1} N.D. GIBSON, C.W. WALTER, D.J. MATYAS, A.N. LEBOVITZ, Y.-G. LI, R.M. ALTON, S.E. LOU, Denison University, R.C. BILODEAU, N. BERRAH, Western Michigan U., A. AGUILAR, ALS, LBL, D. HANSTORP, U. of Gothenburg, Sweden — The K-shell photodetachment spectrum of O^- has been investigated using the merged ion-photon beam photodetachment technique. O^- ions were produced in a Cs sputtered negative ion source (SNICS II) on a Movable Ion Photon Beamline while the photons were produced by the undulator on the Advanced Light Source Beamline 8.0.1. Positive oxygen ions formed by multiple detachment were detected as a function of photon energy. Photoexcitation of a $1s$ electron leads to a short-lived Feshbach resonance $\sim$3 eV below the 1s detachment threshold due to the extra stability of the now full $2p^6$ shell [1]. Energy calibration of the incoming photons, using an inline gas cell, leads to precise energy level assignments for the observed states. The Feshbach resonance is observed near 525 eV in the O^+, O^{2+} and O^{3+} channels. Comparisons to inner-shell photoionization of O will be discussed for both experiment [2] and theory [3].

[1] Bilodeau RC, *et al.*, Phys. Rev. A, **72**, 050701(R), 2005.
[2] Stolte WC, *et al.*, J. Phys. B, **30**, 4489, 1997.
[3] Gorczyca TW, McLaughlin BM, J. Phys. B, **33**, L859, 2000.

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