

Abstract Submitted
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Observation of Bound-Bound Transitions in the Negative Ion of Lanthanum La^{-1} C.W. WALTER, N.D. GIBSON, D.J. MATYAS, A.N. LEBOVITZ, Denison University, Granville, OH, K.J. LIEBL, Oberlin College, Oberlin, OH — The negative ion of lanthanum has been investigated with tunable infrared laser photodetachment spectroscopy. The relative signal of neutral atom production was measured with a crossed laser-ion beam apparatus over the photon energy range 0.29 – 0.49 eV. The spectrum reveals a number of sharp peaks due to bound-bound electric-dipole transitions in La^{-} , observed here through a two-step process of excitation followed by photodetachment of the upper state. The transitions responsible for four of the peaks are identified through comparison to the calculations of O'Malley and Beck [1]. The richness of the observed bound state spectrum is unprecedented for atomic negative ions, and it highlights the uniqueness of La^{-} for applications such as laser cooling.

[1] S.M. O'Malley and D.R. Beck, *Phys. Rev. A* **81**, 032503 (2010).

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