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Investigating Electronic Properties and Bound-Bound Transitions in the Negative Ion of Lanthanum DANIEL MATYAS, ADAM LBOVITZ, KIRSTEN LIEBL, DANIEL GIBSON, WALTER WESLEY, Denison University — The electronic structure and correlation of the electrons in the negative ion of lanthanum have been investigated using laser photodetachment spectroscopy. The ions were photodetached by an infrared laser beam that crossed the ion beam path and the resulting neutral atom signal was measured as the photon energy was scanned. Ten resonance peaks were observed between 0.290eV - 0.510 eV. Some resonance peaks are identified as being due to bound-bound electric dipole transitions by comparing to theoretical calculations [1]. The negative ion of lanthanum is extraordinary because it is only the third atomic negative ion demonstrated to have bound-bound electric dipole transitions and it has several bound states of opposite parity. These properties have led to the proposal of the negative ion of lanthanum as a good candidate for laser cooling [1].

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

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