Bound and Quasibound States of the Negative Ion of Lanthanum (La\textsuperscript{−}) Studied by Photodetachment Spectroscopy\textsuperscript{1} C.W. WALTER, N.D. GIBSON, N.B. LYMAN, J. WANG, Denison University, Granville, OH — The negative ion of lanthanum, La\textsuperscript{−}, has the richest bound state spectrum ever observed for an atomic negative ion \cite{1}, and it has been proposed as perhaps the best candidate for laser cooling of a negative ion \cite{2,3}. In the present experiments, La\textsuperscript{−} is investigated using tunable infrared spectroscopy. The relative signal for neutral atom production was measured with a crossed ion-beam–laser-beam apparatus over the photon energy range 520-900 meV to probe the continuum region above the La neutral atom ground state. The spectrum shows multiple resonance peaks due to transitions to quasibound excited states of La\textsuperscript{−} which subsequently autodetach. In addition, photodetachment thresholds are observed to excited states of La. The measured spectrum is consistent with the recently reported revised electron affinity for lanthanum \cite{4}.

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