Photodetachment from the $S^-$ ion at the $^2P_{1/2} \rightarrow ^3P_2$ threshold$^1$

JOHN N. YUKICH, Davidson College, JAMES E. WELLS, University of Connecticut — Numerous experiments have investigated photodetachment spectroscopy in a magnetic field at the $^2P_{3/2} \rightarrow ^3P_2$ threshold of ions such as $S^-$ and $O^-$. The energy of this threshold is known as the atom’s electron affinity. In this work we have investigated detachment at the lowest-lying threshold for the $S^-$ ion, the $^2P_{1/2} \rightarrow ^3P_2$ threshold. Our experimental apparatus includes a Penning ion trap in which the ions are created, trapped and stored, and a single-mode, ring dye laser. Our observations yield a quantitative measurement for the threshold energy and an indirect measurement for the spin-orbit splitting of the $S^-$ ion.

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