Photodetachment from the S\(^-\) ion at the \(^2\!P_{1/2} \rightarrow \!^3\!P_2\) 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 \(^2\!P_{3/2} \rightarrow \!^3\!P_2\) threshold of ions such as S\(^-\) and O\(^-\). The energy of this threshold is known as the atom’s \textit{electron affinity}. In this work we have investigated detachment at the lowest-lying threshold for the S\(^-\) ion, the \(^2\!P_{1/2} \rightarrow \!^3\!P_2\) 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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