R-matrix with Intermediate Coupling Frame Transformation Calculation of the Spin-Orbit Interactions in Ar Photoionization\textsuperscript{1} Z. FELFLI, Clark Atlanta University, S. T. MANSON, Georgia State University, A. Z. MSEZANE, Clark Atlanta University — Motivated by the recent observation of the giant spin orbit interactions in Ar photoionization [1], we have performed a highly-correlated R-matrix multichannel quantum defect theory (MQDT) along with a term-coupled LS-JK frame transformation method to account for fine structure effects. Briefly, it was found in [1] that the cross sections for the LS forbidden $3p^4[3P]4p^4D_{1/2}^0$ and $3p^4[3P]4p^4D_{3/2}^0$ states were 16 to 30 times larger than those for the LS-allowed doublet states, indicating strong relativistic effects. A comparison of the experimental results with our LS and \textit{LS} – \textit{JK} frame transformation R-matrix calculations will be presented and the nature of the effects responsible for the observed spectra elucidated.


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