

Abstract Submitted
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Relativistic effects in inner-shell photoionization of excited sodium H.-L. ZHOU, A.M. SOSSAH, S.T. MANSON, Georgia State University, A. HIBBERT, Queen's University of Belfast — Using a semi-relativistic Breit-Pauli (BP) R-matrix method we calculated the inner-shell photoionization of the Na $2p^63p\ ^2P_{1/2}$ and $^2P_{3/2}$ excited states. Extensive correlation is included in initial and final state wave functions to approximate complete sets. The calculated energies of initial states of Na are within 1% of the NIST value. The J-dependent branching ratios of the Na⁺ $2p^53p\ ^1,^3L_j$ agree quite well with experimental results.¹ These branching ratios are nearly photon energy independent except in resonance regions. We predict strong $2s2p^63p^2$ resonances around 68.2 eV photon energy, but there is no experiment to compare with. We also used fully relativistic Dirac R-matrix code to calculate the photoionization of excited Na. The results are compared with the BP results. This work was supported by DOE and NSF. The work was performed using the NERSC computer system.

¹D. Cubaynes, et al., Phys. Rev. Lett. **92**, 233002 (2004).

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