Photoelectron angular distributions along Ar and Ca isonuclear sequences

GAGAN B. PRADHAN, JOBIN JOSE, VOJISLAV RADOJEVIC', PRANAWA C. DESHMUKH, IIT-Madras, STEVEN T. MANSON, Georgia State University — The dipole angular distribution asymmetry parameter, $\beta$, for photoelectrons resulting from 2p photoionization of members of the Ar and Ca isonuclear sequences (Ar, Ar$^{6+}$, Ar$^{8+}$, Ca, Ca$^{2+}$, Ca$^{8+}$) has been studied using the relativistic random phase approximation (RRPA) [1] over a broad range of photon energy. In the absence of relaxation, it known that inner shell cross sections are essentially unchanged, as a function of photon energy, on the removal of outer shell electrons [2]. The situation is found to be different for angular distributions; the $\beta$ parameter is not constant, as a function of photon energy, when outer electrons are removed. However, with increasing photon energy, the $\beta$'s arising from the varying stages of ionization become essentially constant. The reason for this behavior is traced to the dependence of $\beta$ upon the Coulomb phase shifts which are not constant as a function of photon energy. At the higher energies, the Coulomb phase becomes less important, resulting in the $\beta$'s coalescing. [1] W. R. Johnson and C. D. Lin, Phys. Rev. A 20, 964(1979). [2] G. Nasreen, S. T. Manson and P. C. Deshmukh, Phys. Rev. A 40, 6091(1989).

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