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Electron correlation and relativistic effects in photoabsorption processes of heavy closed shell atoms: Intermediate shells of Mercury TANIMA BANERJEE, St. Aloysius College, Mangalore and Indian Institute of Technology-Madras, P.C. DESHMUKH, Indian Institute of Technology-Madras, S.T. MANSON, Georgia State University — Accuracy in the study of the photoionization of heavy atomic systems requires the inclusion of both many-body effects (correlation) and relativistic interactions. The Relative Random Phase Approximation (RRPA) [1] is a powerful theoretical model which includes many important electron corrections, along with relativity, in the calculation of atomic photoionization. Previously, valence photoionization in atomic mercury has been investigated using RRPA [2]. To expand the understanding of the the correlation and relativistic effects further, photoionization of the intermediate subshells of atomic mercury, 4s, 4p, 4d, 4f, 5s and 5d, have been studied at different levels of truncations as a means of pinpointing the specific aspect(s) of correlation that is important in a given case. It has been found that the intermediate subshells are sensitive to the correlation and relativistic effects but not as significantly as in the case of valence shell photoionization. In this work we have systematically investigated the changes caused by relativistic and correlation effects on both dipole (E1) and quadrupole (E2) photoionization parameters for atomic mercury.

[1] W.R. Johnson and C.D. Lin, Phys. Rev. A **20**, 964 (1979).
[2] Tanima Banerjee, P. C. Deshmukh and S. T. Manson, Phys. Rev. A, **75**, 042701 (2007).

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