Abstract Submitted
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Relativistic many-body calculations of excitation energies, oscillator strengths, transition rates, and lifetimes in samarium like ions[1]

ULYANA SAFRONOVA, ALLA SAFRONOVA, University of Nevada, Reno, PETER BEIERSDORFER, Lawrence Livermore National Lab — Excitation energies, oscillator strengths, transition probabilities, and lifetimes are calculated for $(5s^2 + 5p^2 + 5d^2 + 5s5d + 5s5g + 5p5f)$–$(5s5p + 5s5f + 5p5d + 5p5g)$ electric dipole transitions in Sm-like ions with nuclear charge Z ranging from 74 to 100. Relativistic many-body perturbation theory (RMBPT), including the Breit interaction, is used to evaluate retarded E1 matrix elements in length and velocity forms. The calculations start from a $1s^22s^22p^63s^23p^63d^{10}4s^24p^64d^{10}4f^{14}$ Dirac-Fock potential. First-order perturbation theory is used to obtain intermediate coupling coefficients, and the second-order RMBPT is used to determine the matrix elements. The contributions from negative-energy states are included in the second-order E1 matrix elements to achieve agreement between length-form and velocity-form amplitudes. The resulting transition energies and transition probabilities, and lifetimes for Sm-like W^{12+} are compared with results obtained by the relativistic Hartree-Fock approximation (COWAN code) to estimate contribution of the $4f$-core-excited states. Trends of excitation energies and oscillator strengths as function of nuclear charge Z are shown graphically for selected states and transitions. This work provides a number of yet unmeasured properti

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