Abstract Submitted
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Excitation energies, hyperfine constants, transition rates, and lifetimes of $5s^2nl$ states in In I and Sn II U.I. SAFRONOVA, University of Nevada, Reno, M.S. SAFRONOVA, University of Delaware, M.G. KOZLOV, Petersburg Nuclear Physics Institute — Energies of $5s^2np_j$ (n = 5–8), $5s^2ns_{1/2}$ (n = 6– 9), $5s^2nd_j$ (n = 5–8), and $5s^2nf_j$ (n = 4–5) states in In I and Sn II are obtained using relativistic many-body perturbation theory. Reduced matrix elements, oscillator strengths, transition rates, and lifetimes are determined for the 102 possible $5s^2nl_j - 5s^2n'l'_{j'}$ electric-dipole transitions. Electric-quadrupole and magnetic-dipole matrix elements are evaluated to obtain $5s^25p_{3/2} - 5s^25p_{1/2}$ transition rates. Hyperfine constants A are evaluated for $5s^2np_j$ (n = 5–8), $5s^2ns_{1/2}$ (n = 6–9), and $5s^2nd_j$ (n = 5–8) states in ^{115}In and ^{113}In. First-, second-, third-, and all-order corrections to the energies and matrix elements and first- and second-order Breit corrections to energies are calculated. In our implementation of the all- order method, single and double excitations of Dirac-Fock wave functions are included to all orders in perturbation theory. These calculations provide a theoretical benchmark for comparison with experiment and theory.

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