Abstract Submitted
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Excitation energies, polarizabilities, multipole transition rates, and lifetimes for francium-like ions[1] WALTER JOHNSON, Notre Dame University, ULYANA SAFRONOVA, University of Nevada, Reno, MARIANNA SAFRONOVA, University of Delaware — Energies of 7s, 7p, 6d, and 5f states in Fr-like ions with nuclear charges Z = 87 - 100 are evaluated using relativistic many-body perturbation theory complete through third order. Reduced matrix elements, oscillator strengths, and transition rates are evaluated for the 7s-7p, 7p-6d, and 6d-5f electric-dipole transitions. Multipole matrix elements for 7s-6d, 7s-5f, and 5f-5f′ transitions are evaluated to determine lifetimes of low-lying excited states. Energies, lifetimes, and transition matrix elements for ions Z = 87 - 92 are also evaluated using the relativistic single-double (SD) method, where single and double excitations of Dirac-Fock wave functions are iterated to all orders in perturbation theory. Ground state scalar polarizabilities in Fr I, Ra II, Ac III, and Th IV are evaluated using both third-order and all-order methods.

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