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Charge radii and beta-decay properties of heavy Hg and Pt isotopes.

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The charge radii, beta decay half-lives (T1/2) and delayed neutron emission probabilities (Pn) are calculated in the chains of heavy Hg and Pt isotopes. The self-consistent Finite Fermi Systems theory (TFFS) with the Fayans energy-density functional DF3-a [1] is used. It describes well the experimental spectra of single-quasiparticle levels in isotopes near Z=82, N >126. The isotopic dependence of the charge radii has a characteristic kink at crossing of the neutron shell N = 126. The kink indices $\xi = \delta < r^2 > (128/126)/\delta < r^2 > (126/124)$, measured in [2,3], are reproduced in the present calculations due to the density gradient pairing and surface terms of DF3-a. In contrast, within the relativistic approach [4] a good description of the radii is achieved mostly due to an inversion of 2ng9/2 and 1ni11/2 levels which exists in the family of relativistic density functionals used in [4] but does not show up in the experimental spectra. Half-lives and Pn values are compared with the compilation of experimental data [5] and with relativistic RHB+RQRPA calculations [6]. Importantly, an inversion of 2ng9/2 and 1ni11/2 levels, does not allow one to simultaneously describe the experimental charge radii and beta decay rates in [4,6]. However, based on the Fayans functional such a description is possible.

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