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QED calculations in heavy many-electron atoms and one-electron quasi-molecules I. I. TUPITSYN, St. Petersburg State University, Russia, M. S. SAFRONOVA, University of Delaware, M. G. KOZLOV, PNPI and LETI, Russia, S. G. PORSEV, University of Delaware and PNPI, V. M. SHABAEV, St. Petersburg State University, Russia — Construction of simple one-electron approach to one-loop QED operator is an important task for the relativistic quantum theory of atoms and molecules. In this work we used two modifications [1,2] of the model QED potential approach to calculations of the Lamb shift in many-electron atoms and one-electron quasi-molecules. The model potential is constructed as a sum of local and nonlocal (separable) potentials. The nonlocal part of the model potential was introduced to reproduce exactly the diagonal elements [2] and also off-diagonal elements [1] of the one-loop ab initio QED operator. The one-particle model QED operator was introduced in the Dirac-Fock and CI+MBPT relativistic calculations of the heavy and super-heavy atoms and in the calculations of the diatomic quasi-molecules. The comparison of the data obtained in different approaches to the one-loop QED operator is presented. Model QED potential is applied to calculate Lamb shift in the U^{91+}-U^{92+} dimer. The results are compared with Ref. [3].
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