Higher-order finite-nuclear-size contributions in light muonic atoms

Savely G. Karshenboim^{a,b,c}, Evgeny Yu. Korzinin^{d,c}, Valery A. Shelyuto^{d,c}, Vladimir G. Ivanov^{c}
(alternative to coauthors) on behalf of the something collaboration

^{a} *Ludwig-Maximilians-Universität, Fakultät für Physik, 80799 München, Germany*
^{b} *Max-Planck-Institut für Quantenoptik, Garching, 85748, Germany*
^{c} *Pulkovo Observatory, St.Petersburg, 196140, Russia*
^{d} *D. I. Mendeleyev Institute for Metrology, St.Petersburg, 190005, Russia*

We discuss the finite-nuclear-size contributions to the Lamb shift in a light muonic atom up to the order $\alpha^6 m$. The related corrections have a different Z dependence and different order in mR_N. The consideration is done within the external field approximation. We also found the leading logarithmic finite-nuclear-size contribution in the next order. It is of the order $\alpha(Z\alpha)^6 \ln^2(Z\alpha)(mR_N)^2 m$ and is comparable with some $\alpha^6 m$ finite-size corrections. A special attention is paid to higher-order effects in muonic hydrogen.