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On the Lamb shift in neutral muonic helium MIRON AMUSIA, Ioffe Physical-Technical Institute, SAVELY KARSHENBOIM, Max-Planck-Institute for Quantumoptik, Garching, Germany, VLADIMIR IVANOV, Pulkovo Observatory, St. Petersburg — The neutral muonic helium is an exotic atomic system consisting of an electron, muon and a nucleus. We consider it as a hydrogen-like atom with a compound nucleus that is also hydrogen-like system. There are a number of corrections to the Bohr energy levels, which all can be treated as contributions of generic hydrogen-like theory. While the form of those contributions is the same for all hydrogen-like atoms, their relative numerical importance differs from an atom to an atom. Here, the leading contribution to the electronic Lamb shift in the neutral muonic helium is found in a close analytic form together with the most important corrections. We believe that the Lamb shift in the neutral muonic hydrogen is measurable, at least through a measurement of the electronic $1s-2s$ transition. We present a theoretical prediction for the $1s-2s$ transitions with the uncertainty of 2 ppm (4 GHz), as well as for the $2s-2p$ Lamb shift with the uncertainty of 0.6GHz.

Miron Amusia
Ioffe Physical-Technical Institute

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