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Muonic Lithium atoms: nuclear structure corrections to the Lamb-shift

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The CREMA collaboration plans to measure the Lamb shift in muonic Lithium atoms, with the goal to extract the charge radius and confront it to electron scattering data. For this experiment to be successful, theoretical information on the nuclear structure corrections to the Lamb shift are needed.

Recently, few-body methods were used to tackle this problem and the most precise estimate of two-photon exchange corrections were provided for a series of light muonic atoms with nuclear mass number ranging from 2 to 4 [1]. With respect to previous estimates, uncertainties were reduced by up to a factor of 5 in certain cases. For the muonic ${}^6\text{Li}$ and ${}^7\text{Li}$ atoms, there exist only rough estimates based on old experimental data, that suffer from very large uncertainty of about 20%.

We will present the first attempt to compute these quantity using the few-body hyper-spherical harmonics technique with a simple nuclear potential [2].

[1] C. Ji, S. Bacca, N. Barnea, O.J. Hernandez, N. Nevo Dinur, J. Phys. G: Nucl. Part. Phys. 45 (2018) 093002.

[2] Anna Poggialini, B.Sci thesis, Universita' di Siena, Italy (2019).

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