

## AB INITIO STUDY OF RADII AND COULOMB SHIFTS OF SIX-NUCLEON ISOBAR ANALOGUE STATES

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The problem of describing the size parameters (matter, charge, neutron radii) of nuclei in an ab initio approach attracts a wide range of researchers. The size parameters of exotic nuclei, in particular, the size of halo (neutron or proton), have the greatest physical significance.

In the present work, for these purposes, one of the most reliable and justified ab initio approaches, No-Core Shell Model (NCSM) [1], is used. Two different NN-potentials are exploited in the calculations, the first of which was obtained from the chiral effective field theory [2], and the second one – from nucleon scattering data using the J-matrix inverse scattering method [3]. Both of these potentials are universal, they have been tested in calculations of binding energies, spectra, and other characteristics. The NCSM calculations are supplemented by the extrapolation procedure for the size parameters proposed in Ref. [4].

In this way, in the current work material, charge, and neutron radii as well as the size of the neutron halo of  ${}^6\text{He}$  isotope are computed. It is interesting to note that the results of calculations of the halo size turned out to be the most stable.

The obtained results are in a reasonable agreement with the modern experimental data. A comparative analysis of the results of other theoretical works is given.

1. C. Stumpf, J. Braun, R. Roth, Phys. Rev. C 93, 021301(R) (2016).
2. A. M. Shirokov, I. J. Shin, Y. Kim, M. Sosonkina, P. Maris, J. P. Vary, Phys. Lett. B 761, 87 (2016).
3. A. M. Shirokov, J. P. Vary, A. I. Mazur, T. A. Weber, Phys. Lett. B 644, 33 (2007).
4. C. Forssen, et al., Phys. Rev. C 97, 034328 (2018).

### The speaker is a student or young scientist

Yes

### Section

1. Nuclear structure: theory and experiment

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