THE FAYANS ENERGY-DENSITY FUNCTIONAL AND CHARGE RADII OF VERY NEUTRON-RICH K ISOTOPES

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The charge radii for K isotopes around the neutron shell closures at $N = 32, 34$ are treated in the fully self-consistent framework with the modified Fayans Density Functional FANDF0_a. The influence of the form of nuclear pairing (volume, surface, gradient) on the radii is studied. A comparison with the experimental charge radii [1] is made for a long isotopic chain. The staggering of the experimental radii can be explained only assuming the complicated volume + surface + gradient form of the paring part of the EDF. The correlation between the anomalous two-neutron emission and neutron-skin ($R_n - R_p$) formation found in [2] is discussed. As for the anomalous radii increase at $A > 47$, it can be explained only if the quasiparticle-phonon coupling is included in the model (see [3]).

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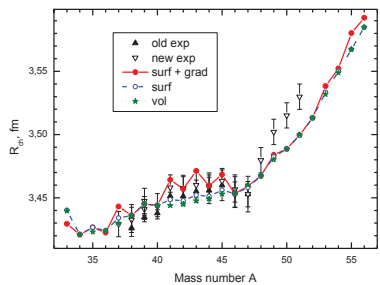

Fig.1 The impact of the different forms of paring correlations (volume, surface, surface+gradient) on the charge radii. The experimental data are from [1].

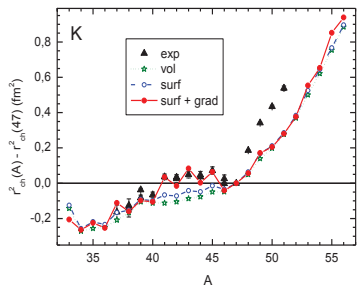

Fig.2 The difference of the rms charge radii of the K isotopes with the reference rms radius of the A = 47 vs the experimental data [1] calculated with the different forms of paring correlations.

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2. I.N.Borzov // Phys.At. Nucl. 2018. V.81(6). P.680.
3. E.E.Saperstein, I.N.Borzov, S.V.Tolokonnikov // JETP Letters. 2016. V.104. P.218.