Structure features of mirror nuclei ^{14}C and ^{14}O within a five-cluster model

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Structure characteristics of the ground [1] and lowest excited states of the mirror nuclei ^{14}C and ^{14}O are studied within a five-particle model (three α-particles and two extra nucleons) using the variational approach with optimized Gaussian bases. Specific features of the density distributions and of pair correlation functions are found, and general spatial structure of the wave functions is analyzed and compared for the excited and the ground states of these nuclei. It is shown that two different spatial configurations are present in ^{14}C and ^{14}O nuclei. The r.m.s. radii, as well as r.m.s. distances between particles are calculated. The charge r.m.s. radius of ^{14}O is predicted, and it is explained the fact that this radius is smaller than that of ^{14}C nucleus, although ^{14}O contains two extra protons instead of two extra neutrons in ^{14}C. Both elastic and transition electrical form factors of ^{14}C and ^{14}O nuclei are predicted.

1. Grinyuk B. E., Piatnytskyi D. V. Structure of ^{14}C and ^{14}O nuclei calculated in the variational approach. *Ukr. J. Phys.*, 2016, **61**, p. 674-680.