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 0_+ states of the 12 C nucleus: Faddeev calculation in configurations space BRANISLAV VLAHOVIC, IGOR FILIKHIN, VLADIMIR SUSLOV, North Carolina Central University, Durham, NC 27707, US — The α -cluster model and Faddeev equations in configuration space are applied to study the ¹²C nucleus. The model includes the Ali-Bodmer nuclear potential [1], attractive three-body potential, and takes into account the Coulomb interaction. An s-wave model [2] is adapted and parameters of the three-body potential are chosen to describe the first two 0_+ levels of ^{12}C . The value of the range parameter of the potential is adjusted to reproduce the position of diffraction minimum for the elastic form factor of ¹²C. The model assumes a strong distortion of the charge density of α clusters inside the ¹²C nucleus. It was found that the most probable configuration of the α -clusters in the 0^+_1 state corresponds to an equilateral triangle with sides as large as 3.5 fm and in the 0^+_2 state to a linear chain with the values of 2.9 fm and 13.1 fm for each link. Having calculated low-lying levels of ¹²C, we found that the contributions of higher partial waves of nuclear interaction to the energy of 3α -system are unnaturally large and some states turn to be overbound. Upon applying the method [3] based on the Pade approximation we got satisfactory description for the 0_3^+ and 0_4^+ states [4]. Additional 0^+ broad resonance obtained in [3] was not found. 1. S. Ali, A. R. Bodmer, Nucl. Phys. 80, 99 (1966). 2. Z. Papp, et al. Few-Body Systems 30, 31 (2001). 3. C. Kurokawa and K. Kato, Phys. Rev. C76, 021301-1 (2005). 4. http://www.tunl.duke.edu/nucldata/.

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