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DIFFRACTION PROCESSES IN 12-C ELASTIC SCATTERING BY MEDIUM NUCLEI

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The study of multicluster structures of a nucleus is an urgent task due to the fact that the influence of cluster states, both excited and ground, rather strongly affects the properties of the nuclei under study. In the framework of the diffraction theory and under the assumption of complete absorption inside the interaction sphere, in this work, the authors obtained expansions of the total amplitudes of the angular distributions of the differential cross sections for elastic scattering of 12-C on nuclei up to 40-Ca. The study of such diffraction processes using the method [1] makes it possible to reveal the partial scattering amplitudes and their contribution to the total amplitude, which characterize the multicluster structure of the nucleus. For a comprehensive analysis of the multicluster structure of nuclei, the authors of [2] proposed an experimental method for the direct detection of cluster structures in the nucleus. The available world experimental data are described within the framework of the method. This method showed itself well in the study of alpha-cluster 4n nuclei. However, for 4n±1 nuclei, a third component was added to the total amplitude [1]. This modification of the method made it possible to describe a larger range of light atomic nuclei. Until now, only incident alpha particles have been analyzed. In [3], the authors performed an analysis of the angular distributions of the differential cross sections of elastically scattered 16-O on 4n nuclei, which fairly well described the experimental data up to 40-Ca.

In this work, the authors chose 12-C as the incident particles. As a result, an analysis of the differential cross sections of elastic diffraction scattering of 12-C on medium nuclei at energies from tens to hundreds of MeV was performed using a modified method of angular distributions. From a systematic analysis of the previous and results of this work, it was obtained and shown that clusters with characteristic radii of 1 fm and 0.5 fm are mainly detected.

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The speaker is a student or young scientist

No

Section

1. Experimental and theoretical studies of nuclear reactions

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