EXAMINATION OF COLLECTIVE AND SINGLE-PARTICLE MODELS FOR EXCITED STATES OF ^{13}C BELOW 10 MeV IN NUCLEAR REACTIONS INDUCED BY 18 MeV DEUTERON BEAM

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The first 10 excited states of the carbon isotope were studied in terms of single-particle and collective models of excitation. Experimental cross sections were obtained by the well-known $\triangle$E–E method. Elastic scattering data were analyzed using an optical model including a nucleus–nucleus interaction potential, while inelastic scattering data were processed using the coupled-channels approach. For the single-particle model, the spectroscopic amplitudes were obtained through calculations of the large-scale shell model with the YSOXT effective NN-potential. A double folding potential was obtained for the d + ^{13}C system. A comparison of model calculations with the experimental cross sections was demonstrated.