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Study of the excited states of 46Ti and 45Ti nuclei in the 45Sc + 3He reaction at a 3He beam energy of 29 MeV

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The angular distributions for the emission of deuterons in the 45Sc(3He,d)46Ti reaction were measured; based on the change in the energy of deuterons, we determined the cross sections for population of the ground and excited states of the 46Ti nuclei formed in this reaction at energy 29 MeV of the 3He bombarding particles. The measured angular distributions for the excited states of the 46Ti nuclei were compared with the data obtained for this reaction at energy 37.7 MeV of 3He [1].
Comparison of the angular distributions for the ground and excited states of 46Ti with DWBA calculations carried out in [1] showed that when protons are stripped from 3He, transfer of angular momenta 3 and 1 occurs, which corresponds to population of the shells 1f7/2 and 2p3/2, respectively. The rearrangement of nucleons in the unoccupied shells 1f7/2 and 2p3/2 leads to excitation of both collective and particle-hole states with different angular momenta. The energy spectra of 46Ti obtained in the experiment were analyzed within the framework of the cluster model of the di-nuclear system [2].
In the case of charge exchange reactions 45Sc(3He,t)45Ti, we also observed a number of excited states of the 45Ti nucleus [3]. None of the studied excited states in 45Ti exhibit a pronounced collective structure.

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