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Transition probabilities in ^{54}Ti: Evolution of the shell structure of neutron-rich titanium isotopes

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Previous investigations of neutron-rich titanium isotopes indicate the development of a subshell closure at $N = 32$. However, shell model calculations could not explain this behaviour so far: the excitation energies of the lowest excited Yrast states in these titanium isotopes are reproduced, but not, for example, the trend of the $B(E2; 2_1^+ \rightarrow 0_{gs}^+)$ values as a function of the neutron number. In addition, only few information about $E2$ transition strenghts between higher Yrast states is known. To measure these, excited states in $^{46-54}$Ti were populated by multinucleon transfer reactions and level lifetimes measured by the Recoil-Distance Doppler-shift method were determined. The experiment was performed at GANIL with the detector system AGATA and the spectrometer VAMOS++ for particle identification as well as the Cologne Compact Plunger for deep inelastic reactions. Lifetimes of the 2_1^+ and 4_1^+ state as well as upper and lower limits of the 6_1^+ and 8_1^+ state in ^{54}Ti, respectively, could be determined with the differential decay curve method (DDCM) and corresponding $B(E2)$ values were calculated. In addition preliminary lifetime values of excited states of the neighbor nucleus ^{53}Ti were determined for the first time and will be presented and discussed in the framework of current shell model calculations.

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