

Deformation Effects in Hot Rotating ^{46}Ti

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The large deformation effects in the light-mass nuclei have been studied over last years, using both gamma and charged-particle spectroscopy. In particular the very elongated prolate or triaxial shapes were observed from the spectra of the Giant Dipole Resonance (GDR) decay for $^{46}\text{Ti}^*$ [1] and $^{45}\text{Sc}^*$ [2]. The results were consistent with the predictions of the LSD (Lublin-Strasbourg Drop) model [3,4], ascribing the large deformation to the Jacobi shape transition. Such deformation were also observed for $^{44}\text{Ti}^*$ [5] by the measurement of light charged particles (LCP) spectra originated from the decay of this nucleus. Additionally, in this mass region, a number of superdeformed bands of discrete γ -ray transitions were discovered (e.g. [6,7]).

The $^{46}\text{Ti}^*$ compound nucleus was created in the reaction $^{27}\text{Al} + ^{19}\text{F}$. The experiment was performed at the VIVITRON tandem facility of the IReS Strasbourg (France), using the multi-detector array ICARE [5] and a large volume (4"x4") BGO detector (see [8] for details).

The deformation effects were investigated by the simultaneous measurement of the light charged particles and the GDR spectra from the $^{46}\text{Ti}^*$ decay in coincidence with the evaporation residues. The proton and α particle spectra were analyzed with the CACARIZO [9] code, a Monte Carlo statistical model for the charged particle emission. The experimental data were compared to the calculated spectra showing the possible signature of very large deformations of the compound nucleus at high spins due to the dynamical effects.

The high-energy γ -rays spectra from the GDR decay measured also in coincidence with evaporation residues were analyzed performing calculations using Monte Carlo CASCADE statistical model code. The comparison of the resulting GDR spectra and the theoretical predictions of the thermal shape fluctuation approach based on the LSD model will be discussed.

These results will be shown compared to the similar data from the experiment done with the HECTOR detectors coupled to the EUROBALL array [10]. The experimental GDR strength function obtained in this measurement is highly fragmented, indicating a presence of a large deformation. In addition the perspectives of this type of investigations will be presented.

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