

Decay-out of ^{151}Tb Yrast superdeformed band

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Since the discovery in 1986 of the first superdeformed (SD) band in the nucleus ^{152}Dy the properties of the SD well has been extensively studied through the whole periodic table from $A \sim 30$ to $A \sim 190$. However, despite the large detection efficiency of the present gamma spectrometers only few SD bands have been connected to the normal deformed (ND) level schemes. Therefore, in most of the cases the excitation energy, the spin and parity of each of their states remain unknown. Their measurement would impose strong constraints to the theoretical models. In the mass region $A \sim 150$ a ~ 4 MeV SD to ND linking transition has been recently discovered for the yrast SD band of ^{152}Dy which 28^+ SD state feeds the 27^- ND one [1].

SD to ND linking transitions have been searched in ^{151}Tb nucleus as the yrast (SD1) and first excited (SD2) SD bands of this nucleus are quite intense (2% and 1% of the evaporation channel, respectively) and as SD2 is a twin band of the yrast SD band of ^{152}Dy [2]. Two experiments have been performed at EUROBALL IV with a ^{27}Al beam delivered by the VIVITRON accelerator at 155 MeV impinging a stack of two thin ^{130}Te targets. These are the best conditions to populate via the 6n evaporation channel a cold ^{151}Tb nucleus at high spin. With the data of the first experiment of 5 days the spectrum triple gated on the yrast SD band has suggested the existence of a 2.8 MeV transition likely decaying to high-lying ND states. No further information could be extracted from the data due to a lack of statistic. A second experiment of 17 days confirmed the existence of the 2.8 MeV transition and lead to the discovery of a new 3.75 MeV linking transition. Their intensities relative to the yrast SD band are a $\sim 10^{-2}$ which corresponds to about 10^{-4} of the 6n channel cross-section. The decay-out properties of the ^{151}Tb yrast superdeformed band will be discussed further in the presentation.

[1] T.Lauritsen et al., Direct decay from the Superdeformed Band to the Yrast Line in $^{152}_{66}\text{Dy}_{86}$ Phys. Rev. Lett. 88, 042501(2002)

[2] T.Byrski et al., Observation of identical superdeformed bands in N=86 nuclei Phys. Rev. Lett. 64, 1650(1990)