

## Search for the GDR Build on Superdeformed Nuclei

A. Bracco<sup>1</sup>, F. Camera<sup>1</sup>, S. Leoni<sup>1</sup>, B. Million<sup>1</sup>, A. Maj, B. Herskind<sup>2</sup>,  
M. Bergström<sup>2</sup>, N. Blasi<sup>1</sup>, A. Algora<sup>3</sup>, A. Gadea<sup>3</sup>, M. Kmiecik,  
G. Lo Bianco<sup>1</sup>, M. Pignanelli<sup>1</sup>, J. Styczeń, and M. Ziębliński

<sup>1</sup>INFN Milano, Italy; <sup>2</sup>NBI Copenhagen, Denmark; <sup>3</sup>LNL Legnaro, Italy

An experiment aimed at finding evidence for  $\gamma$ -decay of the Giant Dipole Resonance (GDR) built on superdeformed nuclear states was performed in Legnaro (Italy) using the EUROBALL  $\gamma$ -detector array coupled to the large BaF<sub>2</sub> detectors of the HECTOR system. The reaction  $^{110}\text{Pd}(^{37}\text{Cl}, 4n)^{143}\text{Eu}$  was used at the beam energy of 165 and 170 MeV. The results from the preliminary analysis confirm our earlier observation [1] and seem to prove the existence of the GDR build on the superdeformed configurations in  $^{143}\text{Eu}$ . In particular, the spectrum of high energy  $\gamma$ -ray gated by low energy transitions which are known to be fed by superdeformed states are found to show a significant excess of yield in the 9-11 MeV region. This is seen in contrast to similar spectrum gated by transitions not fed by superdeformed states. The 9-11 MeV is the  $\gamma$ -ray region where one expects to find transitions originating from the decay of the giant dipole oscillation along the long axis of a superdeformed axially symmetric nucleus. The measured excess yield is found to be of the same order as that predicted by schematic statistical model calculations. In the model it was assumed that the excitation of the GDR build on superdeformed states is restricted to the region of the phase space covering only a few MeV above the yrast line at the very highest spin, in agreement with the feeding observed of SD-bands in general. The further analysis, in which direct gates on superdeformed transitions will be used, is in progress.

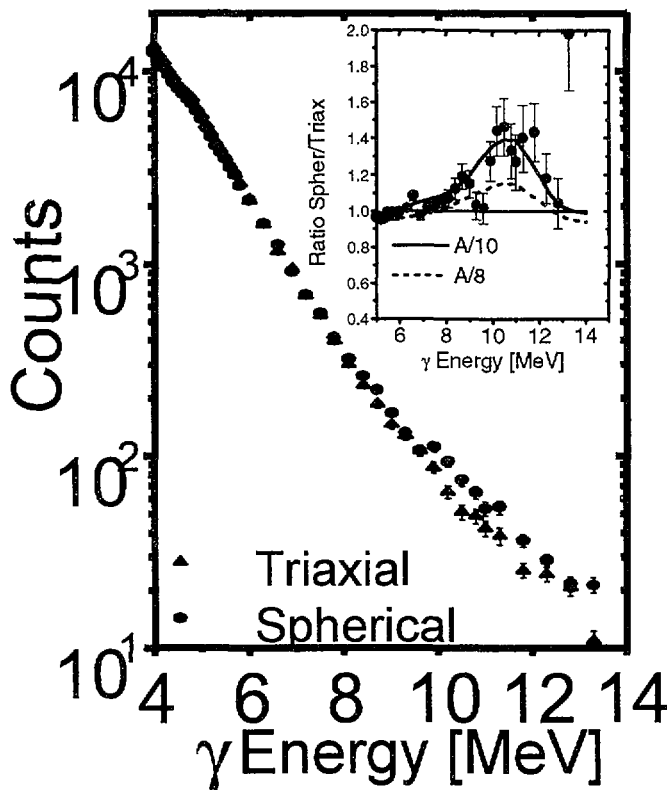


Fig. 1. High energy  $\gamma$ -ray spectra measured in BaF<sub>2</sub>-detectors gated by discrete  $\gamma$ -transitions (measured in EUROBALL) between spherical (populated partly by the SD decay) states and by the transitions between triaxial states (not fed by the SD decay). The inset shows the ratio of the two spectra together with the statistical model predictions.

### Reference:

1. F. Camera et al., Eur. Phys. Journal A2 (1998) 1.