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Coulomb excitation of the band-terminating 12+ yrast trap in 52Fe

In the last decade the 1f 7/2 – shell nuclei have become a very successful test area for nuclear models and interactions. Near the middle of the shell, nuclei show collective properties similar to those observed in heavier nuclei, such as rotational-like bands, band termination, and backbending phenomena. Presently this is the unique region where it is possible to describe deformed nuclei within both themean-field and the shell-model frameworks [1,2].

The 52Fe nucleus (N=Z=26), with two proton and two neutron valence holes in the doubly magic 56Ni, has been a particular experimental challenge. Many attempts to extend the 52Fe level scheme have failed due to the presence of a 12+ isomer, which acts as a ”trap” for the de-exciting ɣ-ray flux, thus 52Fe is known up to the 12 + state [3,4].

The present work aims to investigate the structure and in particular the collectivity in this nucleus by performing relativistic Coulomb excitation of a 52Fe radioactive beam.

The experimental activity has been performed within the AGATA-PRESPEC campaign at GSI. The 52Fe, both ground state and 12+ isomer, was produced by the fragmentation of a 58 Ni primary SIS beam at 600MeV/u. The 52Fe fragments were selected with the FRS setup and finally impinged the 197Au secondary target.

An isomeric ratio of 16% was reached by using FRS to select the higher momentum part of the secondary beam momentum distribution.

Preliminary results on the Coulomb excitation of the ground state and possibly of the isomer will be presented in this contribution.

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