

"g-factor measurements at Rising"

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For the g-RISING collaboration at GSI

In the framework of the RISING campaign [1] at GSI, the cluster γ -detectors were recently mounted in a ring-structure around a magnet [2], in order to perform magnetic moment measurements on isomeric states using the time differential perturbed angular distribution technique (TDPAD). In one of the experiments, using the relativistic fission of a ^{238}U beam at 1 GeV/u, we observed additionally and for free several new isomeric states in the selected cocktail beam.

In order to perform nuclear moment measurements, the selected isomeric ensemble needs to be spin-oriented. The fragmentation reaction itself provides a spin-aligned ensemble of isomeric states, provided that the fragments are selected fully stripped and in a proper longitudinal momentum window. This was demonstrated recently by experiments at the LISE fragment separator at GANIL on intermediate-mass nuclei [3,4]. To produce fully stripped heavy nuclei ($A > 80$), relativistic primary beam energies as produced at GSI, are needed.

The goals of the experimental program where:

- to demonstrate for the first time the presence of spin-alignment in the relativistic fission of a ^{238}U beam and to use this alignment for measuring g-factors of isomers in the selected cocktail beam.
- to measure the g-factor of some isomeric states in Sn isotopes produced by fragmentation of a ^{136}Xe beam, in order to confirm the tentatively assigned single particle structure and spin/parity.
- to demonstrate that very heavy nuclei in the Pb region can be sufficiently oriented by fragmentation of a ^{238}U beam for performing g-factor measurements.

The presentation will address a few typical aspects of such experiments and I will present some preliminary results from the ongoing analysis.

[1] H.-J. Wollersheim *et al.*, Nucl. Instr. Meth. A537, 637 (2005)

[2] G. Neyens *et al.*, A proposal for g-factor measurements on spin-aligned isomeric beams using the RISING cluster detectors

fys.kuleuven.be/iks/lmr/download/gRISING-accepted-2005.doc

[3] G. Georgiev *et al.*, J. Phys. G28, 2993 (2002)

[4] I. Matea *et al.*, Phys. Rev. Lett. 93, 142503 (2004)