

## Isomeric states in neutron-rich $A \sim 110$ , $Z \sim 40$ nuclei studied using RISING at GSI

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The calculation of prolate/oblate shape coexistence [1,2] and multi-quasiparticle states [2] in the  $A \sim 110$  neutron-rich nuclei suggests the possibility of isomerism which would make the nuclei accessible as part of the RISING [3] stopped beam campaign at GSI. This region of nuclei is additional of interest given the proposal of a neutron shell closure at  $N=70$  ( $^{110}\text{Zr}$ ) and the suggestion that this region satisfies the criteria expected for  $X(5)$  symmetry [4]. Therefore an experiment to study  $^{106}\text{Zr}$  and neighbouring nuclei was carried out at GSI following the projectile-fission fragmentation of a beam of  $^{238}\text{U}$  at an energy of 750 MeV/u impinging on a  $^9\text{Be}$  target. The recoiling nuclei were separated and identified in the Fragment Separator (FRS) and stopped in a passive stopper at the second FRS focal point. Delayed  $\gamma$  rays were detected in the RISING [3] array consisting of 105 HpGe crystals mounted in 15 cluster detectors. The nuclei of interest were identified by means of charge (Q) and mass-to-charge ratio (A/Q).

During this experiment the region of neutron-rich nuclei between As ( $Z=33$ ) and Ag ( $Z=47$ ) was mapped. The on-line analysis confirms all known isomeric states in the region. It also gives some evidence for new meta-stable states and details of these and the associated level schemes will be presented.

[1] J.Skalski *et al.*, Nucl. Phys. **A617** 282 (1997).

[2] F.R.Xu *et al.*, Phys. Rev. **C65** 021303(R) (2002).

[3] S.Pietri *et al.*, Nucl. Instr. Methods **B** (2007) in press.

[4] E.A.McCutchan *et al.*, Phys. Rev. **C69** 021303(R) (2004).