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Isomers in the Experimental Storage Ring at GSI

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An experiment was undertaken to study stored and cooled ^{197}Au projectile-fragmentation products in March 2009. First results from this have recently been published [1]. Using the SIS-FRS-ESR setup at GSI it was possible to observe metastable nuclear excitations (isomers) with energies up to 3 MeV, and half-lives extending to minutes or longer. This talk presents briefly the published results of the experiment, before discussing in depth a novel analysis technique which reveals new low-energy isomeric states in odd-A and odd-odd neutron-rich $Z = 73-76$ nuclides. Because of “merging” and/or poor frequency resolution of traversing ions it can be impossible to distinguish ions with very close mass-to-charge ratios, which makes the study of these low-energy metastable states extremely taxing. The analysis technique to avoid this situation will be discussed together with the nuclear structure interpretation.

[1] M.W. Reed et al., Phys. Rev. Lett. 105 (2010) 172501

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