Contribution ID: **28** Type: **not specified**

# Lifetime measurements in A∼96 isotopes via the fast-timing technique.

*Thursday, 24 March 2022 10:00 (30 minutes)*


Shape coexistence is a fundamental phenomenon found in atomic nuclei. It consists in some states displaying different intrinsic deformations while having relatively similar excitation energies [1].
Neutron-rich nuclei belonging to the A∼100 region of the nuclear chart are known to show a large degree of deformation [2]. In particular, the limit N = 60 is well known for showing a dramatic shape change from spherical to deformed [3]. Due to the interplay between these spherical and deformed configurations, shape coexistence is expected in nuclei lying at the border between the two regions [4].
Nuclei belonging to the low-Z edge of the A∼100 deformed region of the nuclear chart were produced in the thermal-neutron-induced fission of a $^{233}$U target at the ILL laboratory. The different isotopes were separated using the LOHENGRIN mass spectrometer and tagged by a ionization chamber. Due to the microsecond-long time of flight of fission products, only states populated via the decay of microsecond isomers in these nuclei, or those populated in the beta decay of their parent nuclei already implanted, were observed thanks to the emitted gamma rays.
Lifetime measurements of excited states in $^{96}$Rb, $^{93-96}$Y and $^{94-95}$Sr were measured using the fast-timing technique [5] with $LaBr_3$:Ce gamma-ray detectors (scintillators), which is able to provide precise measurements down to the tens-of-picosecond regime. From these measurements, reduced transition probabilities and electric quadrupole moments were extracted to provide information on nuclear deformation in this region. In this contribution, preliminary results of the fast-timing analysis on several excited states in the abovementioned nuclei will be discussed, together with some still tentative insight of their physical interpretation. A comparison with theoretical predictions and results from neighbouring isotopes will also be made.



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