



Contribution ID: 176

Type: Oral

Gamma spectroscopy of neutron-rich isotopes in the $A = 100$ region produced in fission induced by cold neutrons with new FIPPS array

Wednesday, 15 May 2019 12:20 (20 minutes)

The occurrence of shape coexistence in nuclei with $N = 58$ and 59 , suggests that the evolution of the deformation is a gradual process. Our goal was to study $N = 57$, ^{96}Y isotope where only a few states were known. Additionally, we decided to investigate whether deformed structures are present in the ^{94}Y nucleus which lies 5 neutrons away from the $N = 60$ boundary and in the ^{97}Y with 59 neutrons. During the talk also the new result concerning the enhancement of octupole collectivity in the $N=60$, ^{96}Zr isotope will be mentioned [1]. The yttrium isotopes have been produced in the fission of ^{235}U active target induced by cold neutron from the reactor at ILL. The level scheme has been established based on multi-fold gamma-ray coincidence relationships measured with the new highly efficient HPGe array FIPPS [2]. For completeness also recent data from the previous fission experiment with EXILL spectrometer has been added.

During the analysis, over 50 new gamma transitions in ^{96}Y isotope, have been identified [3, 4]. Additionally, the analysis revealed that the long 8^+ isomer is located 400 keV higher than it was reported in NNDC base, which has to be taken into account in reactor antineutrino anomaly calculations [5]. By using the delayed-coincidence method it was possible to identify a few weak transitions above the 201-ns isomeric state, which seem to form a rotational band. In the case of ^{94}Y isotope, 11 new gamma transitions have been identified [6] while in the ^{97}Y , 8 new prompt lines can be observed [4]. Angular correlation analysis supported by shell-model consideration allowed to propose spin-parity assignments for most of the new levels.

[1] Ł.W. Iskra et al., Phys. Lett. B 788, 396 (2019)

[2] C. Michelagnoli et al., EPJ 193, 04009 (2018)

[3] Ł.W. Iskra et al., Europhys. Lett. 117, 12001 (2017) and ILL annual report

[4] Ł.W. Iskra et al., (in preparation)

[5] A.A. Sonzogni et al., Phys. Rec. C 91, 011301(R) (2015)

[6] Ł.W. Iskra et al., Phys. Scr. 92, 104001 (2017)

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Session Classification: Session XIV