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Gamma-ray spectroscopy of neutron-rich Niobium isotopes: new insights into the sudden onset of deformation of the A~100 and N=60 region.

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Exotic nuclei, far from stability, are a perfect laboratory to probe the specific components of the nuclear interaction. The imbalance between the number of protons and neutrons can lead to the appearance of phenomena such as sudden shape transitions and shape coexistence. The nuclei with Z and N around 40 and 60, respectively, show one of the most remarkable examples of sudden nuclear shape transition between spherical and well deformed nuclei.
This work reports on new spectroscopic measurements for the neutron-rich Nb isotopes, produced in transfer and fusion-induced fission reactions at GANIL from two different experiments. The combination of the large acceptance VAMOS++, the new generation gamma tracking array AGATA along with the EXOGAM gamma-ray spectrometer provide a unique opportunity to obtain an event-by-event unambiguous (A, Z) identification of one of the fission fragments, with the prompt and delayed gamma-rays emitted in coincidence with unprecedented resolution.
The level scheme of ^{99,102,104,105,106}Nb have been significantly updated and a level scheme is presented for the first time for the ^{107}Nb nucleus. The analysis of a newly observed spherical/deformed shape coexistence in ^{99}Nb will be presented, as the evolution of the nuclear deformation with the increasing neutron number. These results contribute to a better understanding of the nuclear structure of neutron-rich Niobium isotopes and provide very useful experimental data to constrain nuclear models in this complex island of deformation region.

Auteur principal: ABUSHAWISH, Mojahed (Lyon-IP2I)

Co-auteurs: Dr DUDOUET, Jérémie (IP2I); STEZOWSKI, Olivier (IP2I)

Orateur: ABUSHAWISH, Mojahed (Lyon-IP2I)

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