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Study at the corner stone of the region of deformation around A∼100

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Exhibiting one of the most sudden onset of deformation, the neutron-rich A=100 mass region has recently attracted a vast interest from the nuclear structure community.

The influence of the neutron contribution to the deformation has been already well investigated in the Sr and Zr isotopes; however, a better understanding of the role played by the proton orbitals was needed to draw a complete picture of the mechanisms involved in the sudden onset of deformation.
A smooth development of collectivity has been recently observed in ^{96}Kr via mass measurements and Coulomb excitation. The Rb isotopes exhibit a step increase of the quadrupole moment at N=60, indicating deep structural changes by just adding one proton compared to the Kr case.

In the present study, excited states of neutron-rich ^{97,99}Rb were populated for the first time via Coulomb excitation using the REX-ISOLDE facility and the MINIBALL spectrometer. Complementary to the previous magnetic moment measurement, comparisons of the results with particle-rotor model calculations allowed for unambiguous assignment of the $\pi g_{9/2}[431]3/2^+$ Nilsson-model orbital as the configuration of the ground state of ^{97}Rb on top of which the rotational band is built. The degree of deformation in the band is essentially similar to what has been observed well inside the deformation region around A∼100, such as in the Sr and Zr cases.

Moreover, this study highlights the potential of the Coulomb excitation technique to obtain further spectroscopy information far from stability.

Revealing a similar structure, the ^{99}Rb case constituted a challenge, pushing the limits of studying very short lived post-accelerated radioactive beams.

Authors: Prof. STUCHBERY, Andrew (Department of Nuclear Physics, Australian National University, Canberra, Australia); Dr SOTTY, Christophe Olivier (”Horia Hulubei” National Institute for Physics and Nuclear Engineering, 077125 Bucharest-Magurele, Romania); Prof. BALABANSKI, Dimiter (ELI-NP, IFIN-HH, 30 Reactorului Str., 077125 Bucharest - M\u{a}gurele, RomaniaELI-NP, IFIN-HH, 30 Reactorului Str., 077125 Bucharest - Magurele, Romania); GEORGIEV, Georgi (CSNSM Centre de Spectrometrie Nucle aire et de Spectrometrie de); Dr ZIELINSKA, Magdalena (RFU/SPhN, CEA Saclay, F-91191, Gif-sur-Yvette, France)

Co-authors: BLAZHEV, Andrey Atanasov (Institut fur Kernphysik - Universitaet zu Koeln); SIEBECK, Burkhard (Universitaet zu Koeln (DE)); KONDEV, Filip (Argonne National Laboratory); WENANDER, Fredrik John Carl (CERN); SIMPSON, Gary (LPSC); TORNQVIST, Hans Toshihide (Chalmers University of Technology (SE)); DE WITTE, Hilde (KU Leuven (BE)); DIRIKEN, Jan (Katholieke Universiteit Leuven); PAKARINEN, Janne (University of Jyvaskyla (FI)); Dr DAUGAS, Jean-Michel (CEA, DAM, DIF, F-91297 Arpajon cedex, France); KONKI, Joonas (U); Dr GEIBEL, K. (IKP, University of Cologne, D-50937 Cologne, Germany); Dr HADYNSKA-KLEK, Katarzyna (Heavy Ion Laboratory, University of Warsaw, 02-093 Warsaw, Poland); GAFFNEY, Liam (KU Leuven (BE)); SCHECK, Marcus (IKP TU Darmstadt); SEIDLITZ, Michael (Universitaet zu Koeln (DE)); BREE, Nick (Inst. voor Kern- en Stralingsfysica - Katholieke Universiteit Le); WARR, Nigel Victor (Universitaet zu Koeln (DE)); NAPIORKOWSKI, Pawel (Institute of Experimental Physics); REITER, Peter (Universitaet zu Koeln (DE)); MOREL, Pierre (Unknown); Dr CHEVRIER, Raphael (CEA, DAM, DIF, F-91297 Arpajon cedex, France); DAS GUPTA,

Shinjinee (Univ. di Camerino, Dipart. Fisica-Unknown-Unknown); DAVINSON, Thomas (University of Edinburgh); KROELL, Thorsten (Technische Universitaet Darmstadt (DE))

Presenter: Dr SOTTY, Christophe Olivier ("Horia Hulubei" National Institute for Physics and Nuclear Engineering, 077125 Bucharest-Magurele, Romania)

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