Contribution ID: **10** Type: **Submitted**

Coulomb excitation of 196,198,200,202Po studied at REX-ISOLDE with the Miniball γ spectrometer

Tuesday 18 December 2012 09:40 (20 minutes)

The neutron-deficient polonium isotopes with two protons outside the closed Z = 82 shell represent an interesting region of the nuclear chart to study shape coexistence in nuclei [1]. When going from the closed neutron shell at N=126 towards the most neutron deficient nuclei around N=104 the nuclear structure of the polonium isotopes changes from a general-seniority-type regime, towards a structure that is dominated by shape coexistence. The 200Po isotope manifests itself as a transitional nucleus between these two extremes [2,3]. However, questions remain concerning this transition; the sign of deformation and the magnitude of mixing between the different configurations are still unclear. Coulomb excitation at safe energies serves as an ideal technique to investigate the magnitude of transitions between low-lying states, revealing information on the deformation of these states and on the mixing of the different bands.

In the September 2009 test phase of the IS479 experimental campaign [4] 200Po beams were produced and post accelerated to an energy of 2.85 MeV/u at the REX-ISOLDE facility in CERN. The radioactive ion beam was delivered to a stable 104Pd target placed in the middle of the Miniball γ spectrometer to induce Coulomb excitation. There was little or no contamination with a beam purity of 98.8(9)% and the count rate of ˜106 pps at Miniball with a proton beam intensity of 1.1μA confirmed the predicted count rates.

The test phase was followed by a successful continuation of the experimental campaign in September 2012. During the remaining beam time, beams of 196,198,202Po were produced and post accelerated at REX-ISOLDE and Coulomb excitation was observed at the Miniball detection setup for all the isotopes. Furthermore parasitic data on the Coulomb excitation of 196Tl, which was the 50% contaminant in the 196Po beam, was gathered.

Using the Coulomb excitation analysis code Gosia [5] and the experimental information it will be possible to determine the B(E2) values coupling the low-lying excited states for the whole transitional range (196-202Po). In 196Po it will be especially interesting to compare the B(E2) value from the Coulomb excitation experiment to the value determined from the lifetime experiment [6]. The amount of statistics should also allow us to fix the sign of the quadrupole moments of the first excited 2+ states. Finally these results will be discussed within the framework of shape coexistence and configuration mixing and will be compared with recent results from beyond mean-field calculations [7].

In the presentation the first results from the 2012 experimental campaign will be shown together with the results from 2009.

[1] K. Heyde and J.L. Wood, Rev. Mod. Phys 83 (2011) 1467.
[2] R. Julin et al., J. Phys. G 27 (2001) R109.
[3] A.M. Oros et al., Nucl. Phys. A 645 (1999) 107.
[4] B. Bastin et al., INTC-P-247 (2008).
[5] T. Czosnkyka, D. Cline, C.Y. Wu Bull. Amer. Phys. Soc. 28 (1983) 745.
[6] T. Grahn et al., PRC 80 (2009) 014323.
[7] P.-H. Heenen, private communication (2012)

Primary author: KESTELOOT, Nele (Katholieke Universiteit Leuven (BE))

Co-authors: BASTIN, Beyhan (Katholieke Universiteit Leuven-Unknown-Unknown); VOULOT, Didier (CERN); RAPISARDA, Elisa (CERN); WENANDER, Fredrik John Carl (CERN); Mr DIRIKEN, Jan (Katholieke Universiteit Leuven); WRZOSEK-LIPSKA, Katarzyna (Katholieke Universiteit Leuven (BE)); Mr GAFFNEY, Liam (University of Liverpool (GB)); Dr ZIELINSKA, Magdalena (CEA Saclay); SCHECK, Marcus (TU Darmstadt); HUYSE, Mark L (Katholieke Universiteit Leuven (BE)); Mr BREE, Nick (K.U.Leuven); Dr WARR, Nigel (Institut für Kernphysik Köln); Prof. BUTLER, Peter (University of Liverpool (GB)); Prof. VAN DUPPEN, Piet (Katholieke Universiteit Leuven (BE)); GRAHN, Tuomas

Presenter: KESTELOOT, Nele (Katholieke Universiteit Leuven (BE))

Session Classification: Heavy nuclei