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Detailed studies of ^{214,216,218}Po via β decay of ^{214,216,218}Bi

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The odd-odd bismuth isotopes (Z = 83) and their β-decay polonium daughters ($Z = 84$) are excellent subjects for nuclear structure studies. With only one and two protons, respectively, above the closed shell Z = 82, they provide an outstanding testing ground for shell-model calculations, and in the case of polonium isotopes, also for the seniority scheme. Moreover, both isotopic chains exhibit a wide variety of low-lying isomers. While the neutron-deficient bismuth and polonium isotopes are rather well explored, the information on the neutron-rich side is often scarce because of limitations in available experimental techniques.

In this contribution, results of a high-statistics β-decay experiment aimed at neutron-rich ^{214,216,218}Bi isotopes carried out at ISOLDE Decay Station (IDS) [1] are discussed. The levels populated in daughter nuclei were investigated employing an array of HPGe clover and fast-timing LaBr detectors. A new isomer was identified in ^{214}Bi [2] and complex decay schemes of ^{216g,m}Bi were established [3]. Lifetimes of yrast levels in ^{214,216,218}Po were measured and the deduced transition probabilities $B(E2)$ were confronted with theoretical models [4]. Shell-model calculations based on two different effective interactions, the H208 [5] and the modified Kuo-Herling particle interaction [6], were performed and compared with experimental results. Preferred spin and parity assignments for ^{214m}Bi and ^{216g,m}Bi based on the calculations and observed β-decay feeding intensities will be discussed.

References

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Author: ANDEL, Boris (Comenius University (SK))

Co-author: ON BEHALF OF RILIS-IDS-YORK-LEUVEN-BRATISLAVA-BUCHAREST-KÖLN-CONSTANTINE-IS650 COLLABORATION

Presenter: ANDEL, Boris (Comenius University (SK))

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