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Lifetime Measurements of Low-Lying Excited States in ^{211}Bi

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Abstract

The nucleus ^{211}Bi (Z = 83, N = 128) lies one proton and two neurons above the doubly magic ^{208}Pb core, making it a sensitive probe of nuclear structure near a closed shell. Despite its structural importance, experimental information on electromagnetic transition probabilities and lifetimes for its low-lying excited states remains scarce. For this reason an experiment was performed at the Institut für Kernphysik, Cologne. employing two complementary techniques - the Recoil Distance Doppler Shift (RDDS) method and the Doppler Shift Attenuation Method (DSAM) - which together cover a broad sensitivity range to measure the lifetimes of the lowest excited states in ^{211}Bi.This contribution presents the preliminary analysis of the experimental data, with the goal of extracting state lifetimes and the corresponding transition probabilities, offering a new experimental input for shell model calculations in this mass region.

References

[1] K.S. Krane, *Introductory Nuclear Physics*, John Wiley & Sons, New York (1991).

[2] A. Dewald, O. Möller, and P. Petkov, “Developing the recoil distance doppler-shift technique towards a versatile tool for lifetime measurements of excited nuclear states,” *Progress in Particle and Nuclear Physics*, vol. 67, no. 3, pp. 786–839, 2012.

[3] A. Dewald, S. Harissopulos, and P. Von Brentano, “The differential plunger and the differential decay curve method for the analysis of recoil distance doppler-shift data,” *Zeitschrift für Physik A Atomic Nuclei*, vol. 334, pp. 163–175, 1989.