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Coulomb excitation of 200Po studied at REX-ISOLDE with the Miniball γ spectrometer

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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. 200Po manifests itself as a transitional nucleus between a general-seniority-type regime in the heaviest polonium isotopes and a shape-coexistence character in the lightest polonium isotopes [1,2]. 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 a vigorous 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.

Pure 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. The Doppler corrected de-excitation gamma spectrum showed, next to the 200Po de-excitation peak, a big amount of polonium X rays. After taking into account the X rays produced in an atomic process [3], the remaining X rays could be assigned to the E0 transition from the 0+2 state to the ground state. The observed de-excitation rates were included in the Coulomb excitation analysis code Gosia to extract transitional matrix elements connecting the low-lying states in 200Po. These results will be discussed within the framework of shape coexistence and mixing. They will also be compared with recent results from beyond mean-field calculations [4].

These results will be complemented by the rest of the experimental campaign on shape coexistence in neutron-deficient polonium isotopes [5].

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