Coulomb excitation of ^{110}Cd studied with AGATA at LNL *

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For several decades, stable even-mass Cd isotopes have been considered to be textbook examples of multiphonon spherical vibrators [1] based on the excitation energy pattern of their low-lying states. However, a detailed study of ^{110}In β decay and subsequent beyond-mean-field theoretical calculations [2-5] suggested instead the presence of multiple shape coexistence in ^{110}Cd and ^{112}Cd isotopes. To verify this hypothesis complete sets of transitional and diagonal E2 matrix elements, including their relative signs, are needed. This key experimental information can be obtained by applying the low-energy Coulomb-excitation technique [6].
Coulomb excitation of ^{110}Cd using a 187-MeV ^{60}Ni beam was performed at National Institute for Nuclear Physics – Legnaro National Laboratories, Italy [7]. This experiment was a part of a broader program focused on systematic Coulomb-excitation studies of ^{110}Cd initiated at Heavy Ion Laboratory, University of Warsaw, with light beams of ^{14}N and ^{32}S ions [5]. The program also included the measurements with heavier reaction partner ^{208}Pb, which was performed at Argonne National Laboratory, USA.

The ^{60}Ni + ^{110}Cd experiment was carried out using 11 AGATA triple clusters [8,9] and the particle detection array SPIDER [10] to register back-scattered beam ions. SPIDER was placed at laboratory angles ranging from 128 to 160 degrees to enhance the probability of multistep Coulomb excitation. In total 19 states of both negative and positive parity were populated up to 2.8 MeV of excitation energy, including in particular the 0_3^+ state at 1731 keV. The on-going analysis focuses on the extraction of the γ-ray intensities from which a set of electromagnetic matrix elements in ^{110}Cd will be extracted, including quadrupole moments of excited states. This will yield quadrupole deformation parameters for the 0_2^+ and 0_3^+ states, including the non-axiality parameter γ. Details of the experiment performed with AGATA at LNL and selected aspects of the Coulomb-excitation data analysis will be presented.

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