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First Measurements of the Quadrupole Moment of the 2+ State and B(E2) Value of the 4+ State in 110Sn from Coulomb Excitation

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The experimental B(E2) values in light even-even Sn isotopes are found to be enhanced compared to theory, a discrepancy which has eluded a satisfactory solution for over a decade. For further examination, supplementary information such as spectroscopic quadrupole moments (Q_s) are needed.

A safe-energy Coulomb excitation of ^{110}Sn was conducted at HIE-ISOLDE, CERN. The ^{110}Sn beam was accelerated to 4.4 MeV per nucleon and Coulomb excited on a 4-mg/cm^2 ^{206}Pb target. Gamma rays from the beam and target nuclei were detected with the Miniball HPGe spectrometer.

The $Q_s(2_1^+)$ of ^{110}Sn was newly determined with a preliminary value of $+0.22^{+0.08}_{-0.06}$ eb. Both the sign and the magnitude of $Q(2_1^+)$ are in agreement with the Monte Carlo shell model prediction of an oblate shape for the 2_1^+ state in ^{110}Sn [1]. Independent lifetime measurements of the 2_1^+ and 4_1^+ states were also performed with simulations. The preliminary $B(E2\uparrow)$ value of our work is 0.236(17) e^{2}b^2, consistent with previous experiments [2-4] but with a higher precision. A preliminary $B(E2\downarrow)$ value of the 4_1^+ state was determined as 200^{+50}_{-70} e^{2}fm^4. This B(E2) value suggests an enhanced pairing force in light Sn isotopes [5]. Details on the new and improved spectroscopic results will be presented and compared to theory.

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