Shape coexistence in the neutron-deficient nuclei near Z=82

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Since the first application of isotope-shift measurements a sharp shape transition in the ground states of light odd-mass mercury isotopes was observed, and shape coexistence near the Z=82 shell has been an actively studied phenomenon. In neutron-deficient even-mass mercury isotopes a weakly deformed oblate ground-state band is found to coexist with a more deformed prolate band. The prolate states are interpreted as a π(4p-6h) excitation across the Z=82 shell gap. The prolate band build upon an excited 0^+ state can be related to similar structures in the Pb nuclei. The energy of this prolate structure is lowest in ^{182}Hg and shows a parabolic trend of excitation energy as a function of the neutron number. In the neighboring even-mass platinum isotopes this structure reaches even the ground state. In the Hg isotopes ^{180}Hg is the most exotic nucleus for which lifetimes of excited states are known so far. These can be used to determine model-independent B(E2)-values and absolute values of deformation employing the rotor model. A breakdown of the shape-coexistence is predicted with further decreasing neutron number. We will present lifetime measurements of excited states in ^{178}Hg using the Recoil Distance Doppler-Shift (RDDS) method. The recoil-decay tagging (RDT) technique was applied to select the ^{178}Hg nuclei and associate the prompt γ-rays with the correlated characteristic ground state α-decay.

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