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Coulomb excitation of neutron-deficient mercury isotopes

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Since a clear shape dissimilarity in the ground state of light odd-mass mercury isotopes was observed by means of isotope shift measurements [1], shape coexistence in this mass region has been an intensively studied phenomenon by means of in-beam spectroscopy and decay spectroscopy. For light even-mass mercury isotopes, it has been advocated that a prolate band at low excitation energy is coexisting with an oblate ground state band [2,3]. Coulomb excitation at safe energies serves as a vigorous technique to investigate the magnitude of transitions between low-lying states, revealing information on the mixing of the different bands. Pure beams of 182,184,186,188Hg were delivered to a stable Cd target placed in the middle of the MINIBALL gamma spectrometer to induce Coulomb excitation. The obtained beam intensities were sufficient for the population of low-lying, low-spin states and the detection of the subsequent gamma decay. Observed deexcitation rates enable the transitional quadrupole matrix elements connecting different states to be extracted. Also the sign of the diagonal matrix element of the first excited 2+ state, containing the information about the nuclear quadrupole deformation, will be presented.

[1] J. Bonn et al., Phys. Lett. B38 (1972) 308
[2] W. Nazarewicz, Phys. Lett. B305 (1993) 195
[3] R. Julin et al., J. Phys. G 27 (2001) R109

Summary

We report on a Coulomb excitation experiment at 'safe' energies on the even-even neutron-deficient 182,184,186,188Hg isotopes at the REX-ISOLDE radioactive beam facility. Observed deexcitation rates enable the transitional quadrupole matrix elements connecting different states to be extracted. Also the sign of the diagonal matrix element of the first excited 2+ state, containing the information about the nuclear quadrupole deformation, will be presented.

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