Evolution of the first mixed-symmetry 2^+ state in the N=80 isotones*

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The evolution of the first mixed-symmetry 2^+ state in the N=80 isotones from ^{132}Te to ^{142}Sm has been of great interest for the past two decades [1,2,3,4,5]. A Coulomb-excitation experiment measuring the M1 transition strength of the $2^+_{\mathrm{ms},1} \rightarrow 2^+_1$ transition of ^{132}Te gave unusually big and inconclusive results [1]. Therefore, this transition strength has been precisely determined by a direct lifetime measurement of the $2^+_{\mathrm{ms},1}$ state of ^{132}Te with the Doppler shift attenuation method (DSAM), populated after a two-neutron transfer reaction at IFIN-HH. A recent Coulomb-excitation experiment of ^{142}Sm at HIE-ISOLDE yielded absolute matrix elements, yet, M1 character for the $2^+_{\mathrm{ms},1} \rightarrow 2^+_1$ transition had to be assumed [6]. In order to ascertain the multipolarity of this transition, a complementary experiment was conducted at the Heavy Ion Laboratory (HIL) in Warsaw in 2021. Combined, these experiments will expand the understanding of the first mixed-symmetry 2^+ state in this isotonic chain.

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