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Title: **Measurements of spectroscopic quadrupole moments at high spins: test of the Tilted Axis Cranking (TAC) model**

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Several measurements of spectroscopic quadrupole moments of high-spin isomers ware carried out recently at the CYCLONE facility at Louvain-la-Neuve, using the Level Mixing Spectroscopy (LEMS) technique [1]. All of them aimed to test the predictions of the Tilted Axis Cranking (TAC) model [2]

The spectroscopic quadrupole moment of the high-spin, high-K five-quasiparticle isomer ($K^\pi = \frac{35}{2}^-$, $T_{1/2} = 750 \pm 80$ ns, $E_i = 3349$ keV) in ^{179}W was found to be $Q_s = 4.00(^{+0.83}_{-1.06})$ eb, which corresponds to an intrinsic quadrupole moment $Q_0 = 4.73(^{+0.98}_{-1.25})$ eb and to a quadrupole deformation $\beta_2 = 0.185(^{+0.038}_{-0.049})$. These values differ significantly from the deduced ground-state quadrupole moments and deformations and are in disagreement with the current theoretical predictions in this mass region [3].

In another experiment we have measured the spectroscopic quadrupole moment of the $I^\pi = 11^-$ isomer in ^{196}Pb. This isomer has the same proton $\pi(s_{1/2}^{-2} h_{9/2} i_{13/2})$ configuration as the $I^\pi = 16^{(-)}$ bandhead of the magnetic band in ^{196}Pb, which allows to deduce the quadrupole moment of the $16^{(-)}$ state as $Q_s = -0.316(97)$ eb. This is the first experimental determination of the quadrupole moment of a magnetic rotational bandhead. Its small value proves the nearly sphericity of the magnetic bandhead [4].

References

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