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Quadrupole excitations in self-conjugate nuclei: pushing the limit.

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In nuclei along the N = Z line, as protons and neutrons occupy the same valence orbitals, proton-neutron correlation properties and quadrupole-quadrupole interactions emerges. In heavy even N = Z nuclei the competition between prolate and oblate quadrupole coherence is hitherto not measured. Well-developed deformation in the upper fpg shell starts from ^{68}Se. In ^{68}Se, the intrinsic deformation of the ground-state band has been interpreted as oblate, while a prolate deformation is assigned to the excited band that soon becomes yrast. The tendency leads to the emergence of shape coexistence, which are predicted in the strongly deformed ^{72}Kr, ^{80}Zr and ^{84}Mo [1].
In this study, exploiting an ^{86}Mo radioactive beam produced at NSCL, we measured the lifetime of the first 2^+ state in ^{84}Mo and ^{86}Mo using the GRETINA array and a plunger setup. The reduced transition probability B(E2; $2^+ \longrightarrow 0^+$) of the Mo isotopes were deduced, thereby understanding their quadrupole collectivity and deformation.
The experimental results will be presented along with their interpretation with state-of-the-art calculations using ZBM3 effective interaction
[1] A. P. Zuker, A. Poves, F. Nowacki, and S. M. Lenzi, Phys. Rev. C 92, 024320 (2015).

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