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New High-spin states in W-182

This work presents a detailed investigation of high-spin states in ^{182}W, populated through a deep-inelastic reaction using an 840 MeV ^{136}Xe beam on a thick ^{186}W target and studied using coincidence γ-ray spectroscopy. Out-of-beam data were used to extend the known level scheme, confirming the $K^{\pi} = 16^{+}$ rotational band up to the 19^{+} state and identifying new levels feeding this structure. The study is motivated by the need to understand how nuclear structure evolves at high angular momentum. Several new intrinsic states have been observed up to 6549 keV, including an isomeric state with a lifetime of 148(9) ns. Spin and parity assignments were derived from transition multipolarities using internal conversion coefficients, angular correlation and mixing ratios, with most states firmly characterized, including the 6549 keV state assigned $K^{\pi} = 24^{-}$.

No new rotational bands were observed, indicating a dominance of intrinsic configurations at high spin. Configuration assignments, supported by multi-quasiparticle calculations, led to the identification of several six-quasiparticle states with transition strengths consistent with neighboring nuclei in the A $\approx$ 180 region. At high K-values, weak transitions intensities limited the full characterization of some states, however, the long lifetime of the $K^{\pi} = 24^{-}$ isomer is suggested to arise from configuration changes rather than K-forbidden decay, while $K^{\pi} = 20^{+}$ isomer shows behavior consistent with K-isomerism. Overall, this work provides insight into the increasing dominance of intrinsic structure over collective motion at high-spin in ^{182}W.

Primary author: MAPHAGE, Lefika (iThemba LABS/UCT)

Presenter: MAPHAGE, Lefika (iThemba LABS/UCT)

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