

Gamma-ray spectroscopy of ^{184}Os studied via the $^{176}\text{Yb}(^{12}\text{C},4n)^{184}\text{Os}$ fusion-evaporation reaction

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Introduction and Motivation

- Os ($Z=76$) isotopes exhibit a variety of deformation and transition phenomena
- ^{184}Os features a rotational ground-band, β - and γ -bands, and high K-isomers
- The proxy-SU(3) model predicts shape coexistence in this nucleus

In this work:

- Gamma-spectroscopic information was extracted and analyzed using a new reaction to populate the states of interest
- Reconstruction of the level scheme and computation of branching ratios

Experimental details

- 9 MV Tandem accelerator at IFIN-HH [1]
- Reaction: $^{176}\text{Yb}(^{12}\text{C},4n)^{184}\text{Os}$ fusion-evaporation
- Beam: ^{12}C at 60 MeV
- Target: highly enriched (isotopic) metallic ^{176}Yb
- Detection using the RoSPHERE array [1]: 15 HPGe detectors
- Ground-state and side bands were populated



Fig 1: The 9 MV Tandem accelerator in IFIN-HH

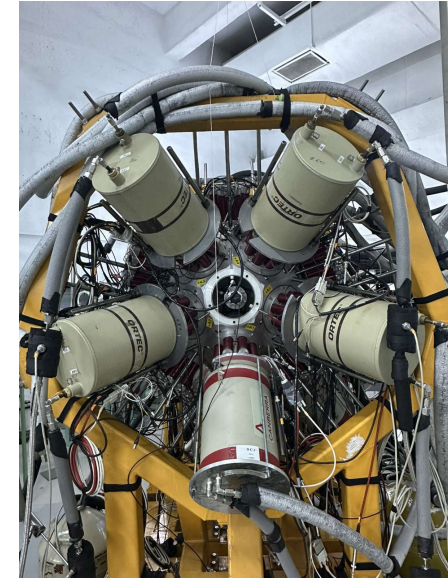
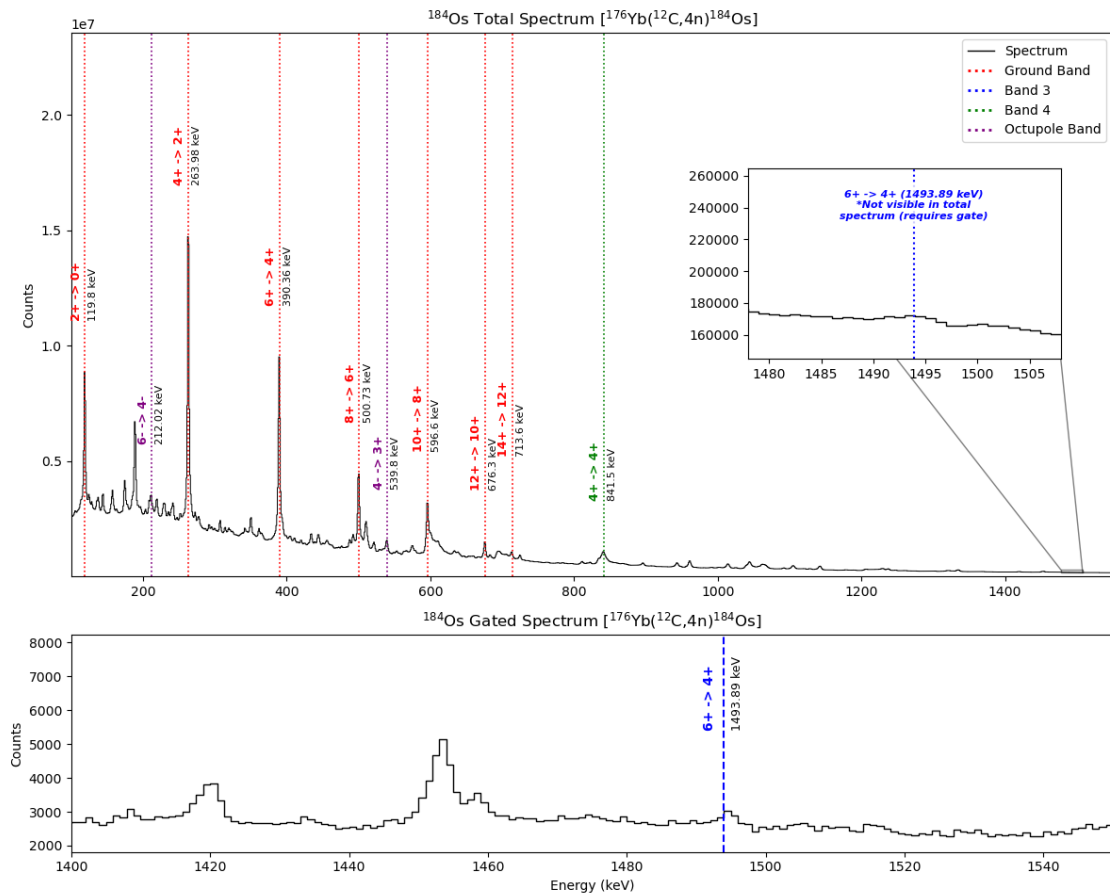


Fig 2: RoSPHERE array.

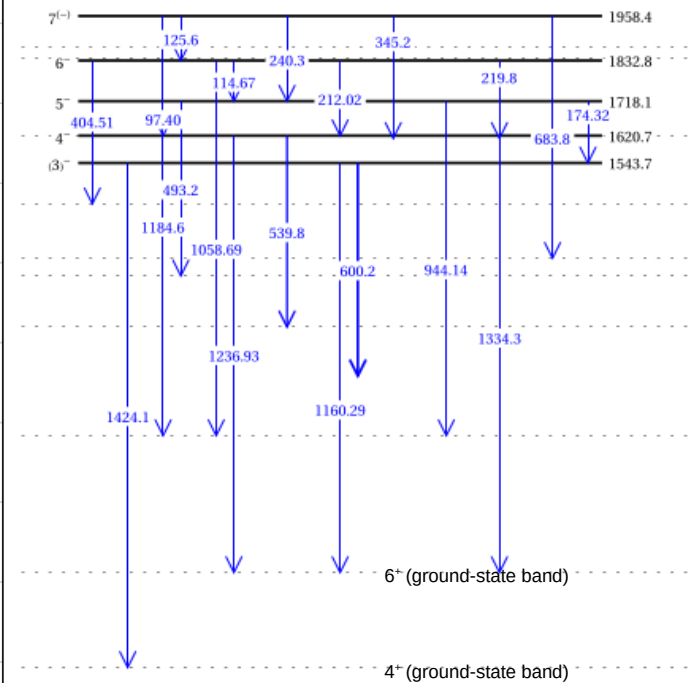
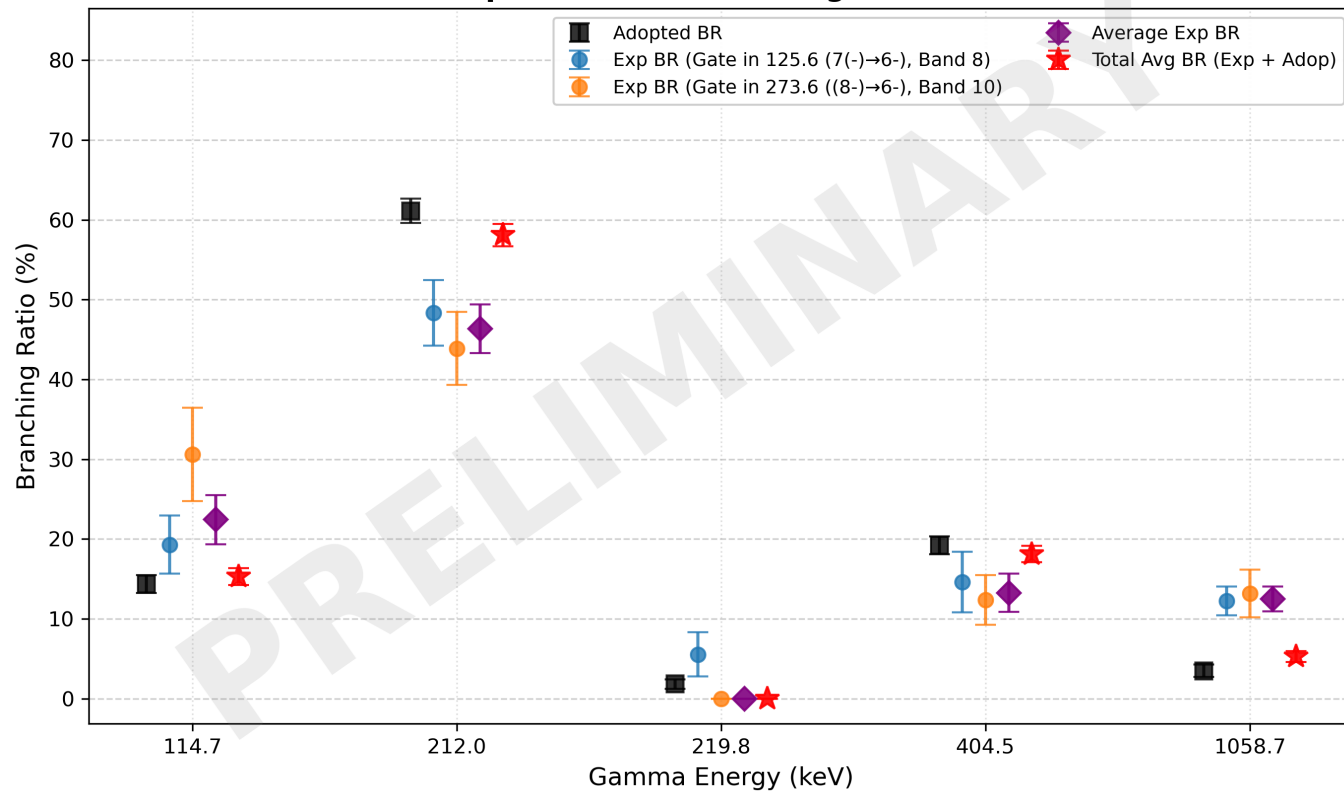
Analysis

- The HPGe data were sorted into symmetric γ - γ matrices
- Weak peaks which were indistinguishable from the background in the total projection spectrum were identified using coincidence gating



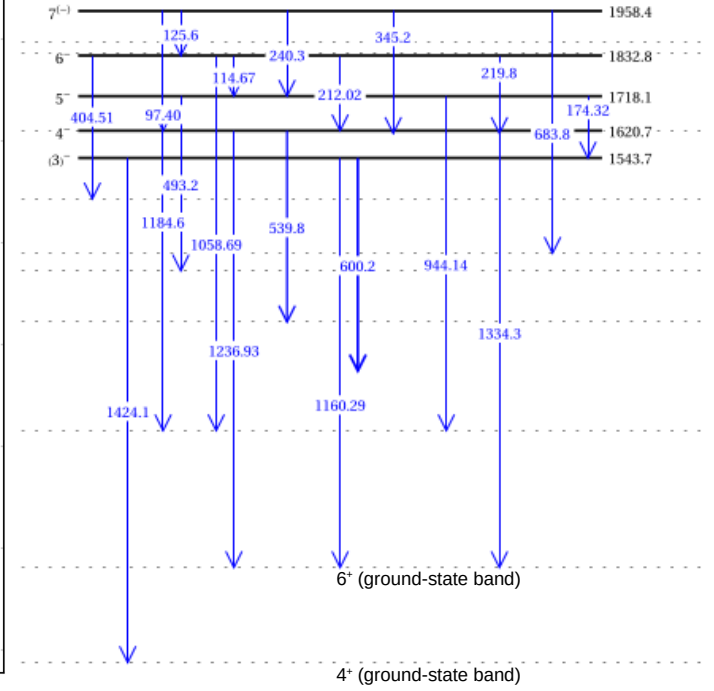
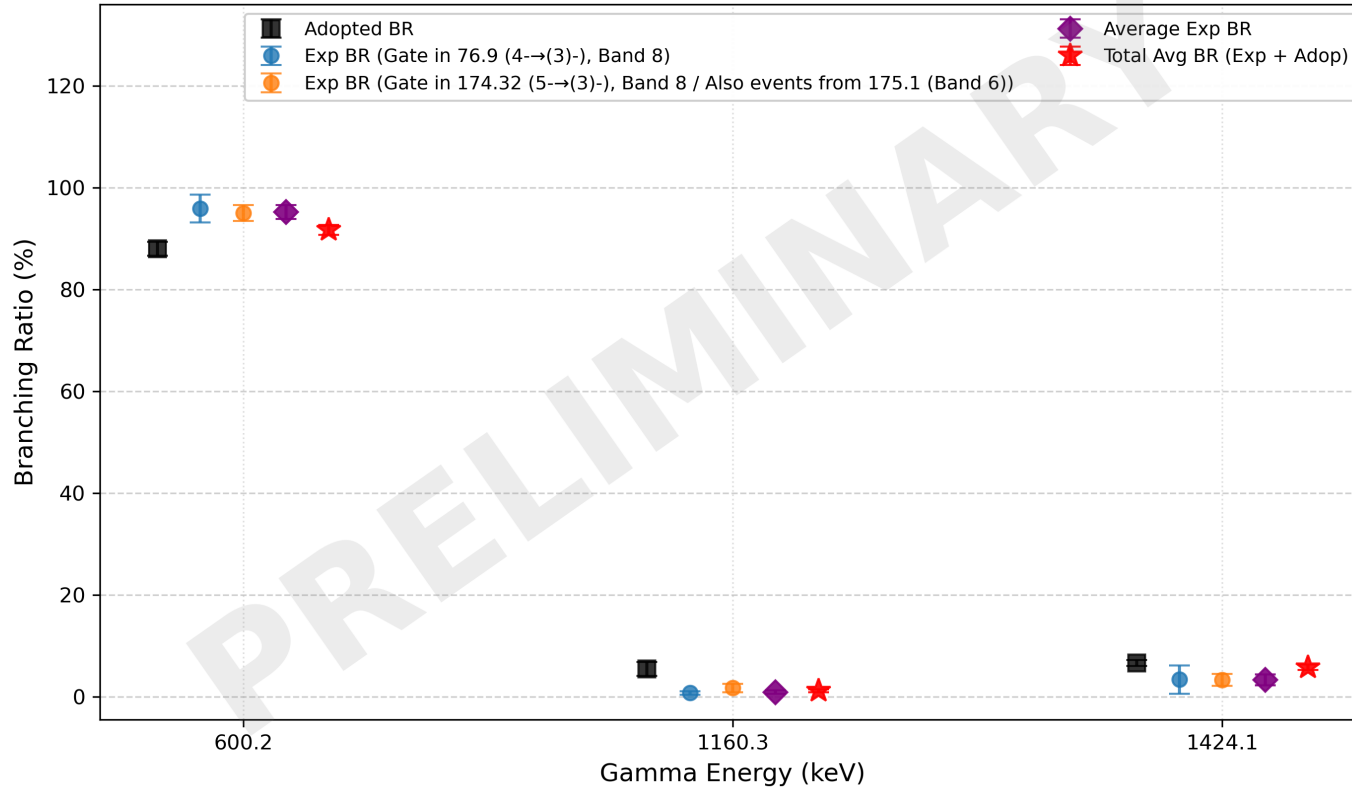
Results

184Os Octupole Band - Branching Ratios for 6- level



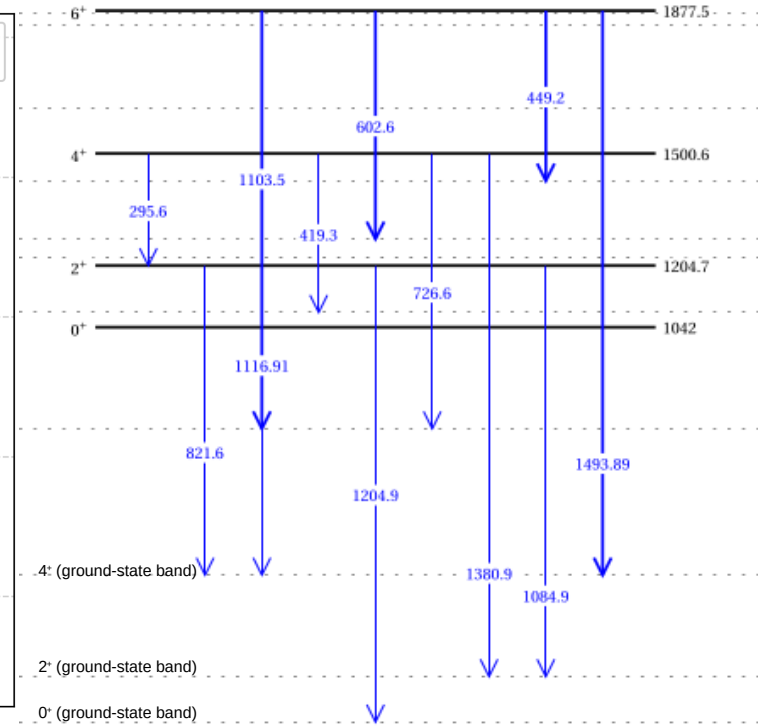
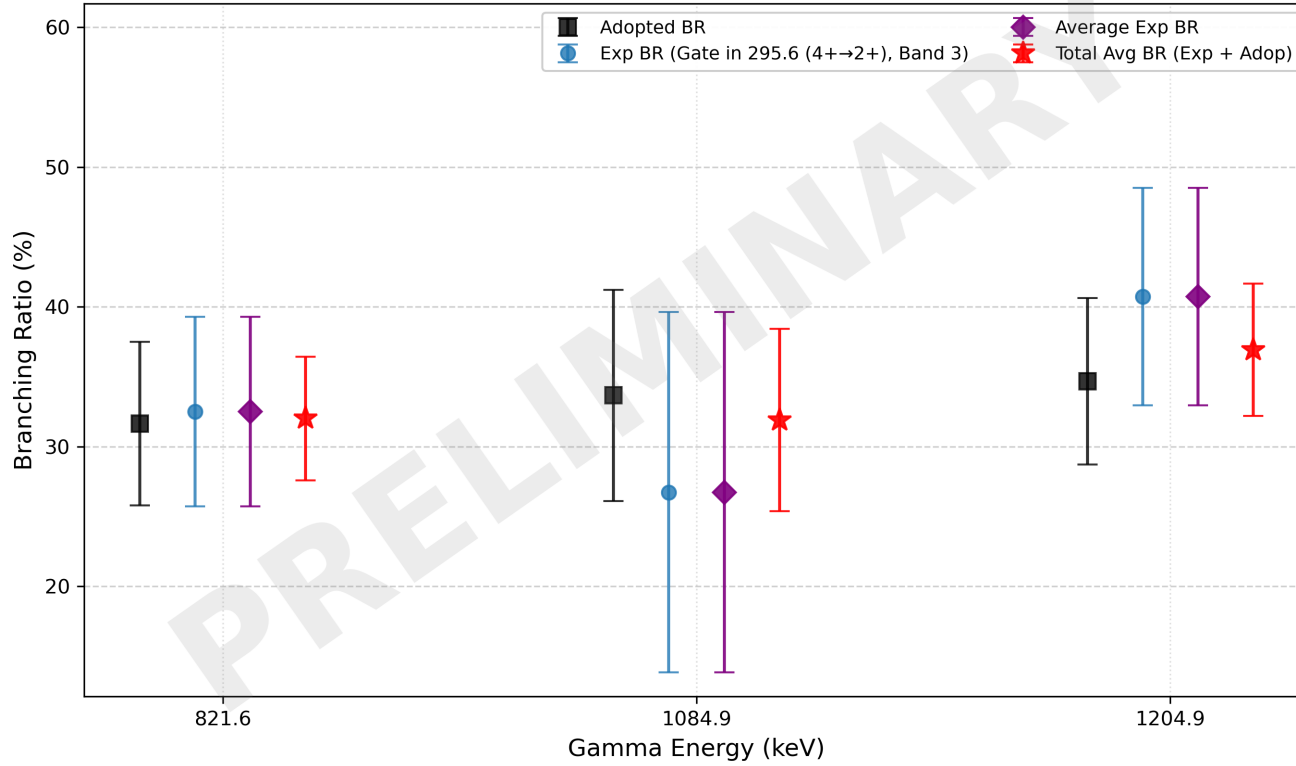
Results

184Os Octupole Band - Branching Ratios for (3)- level



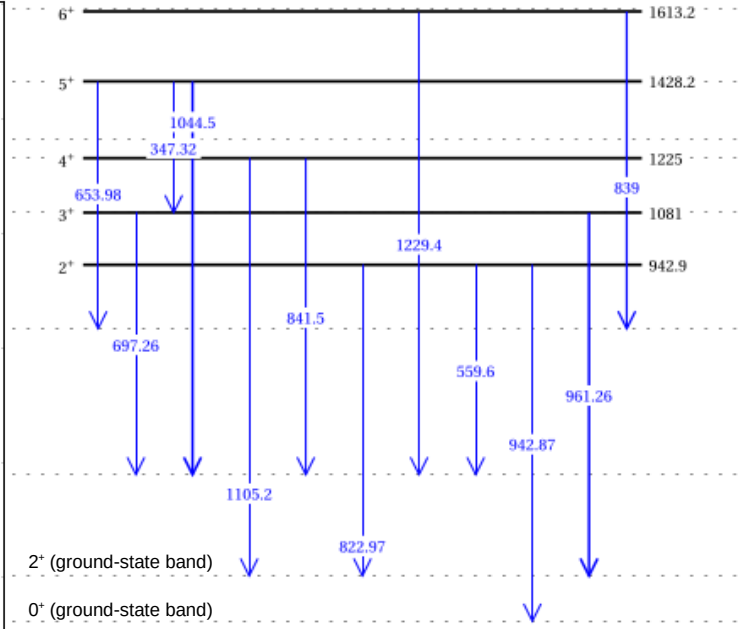
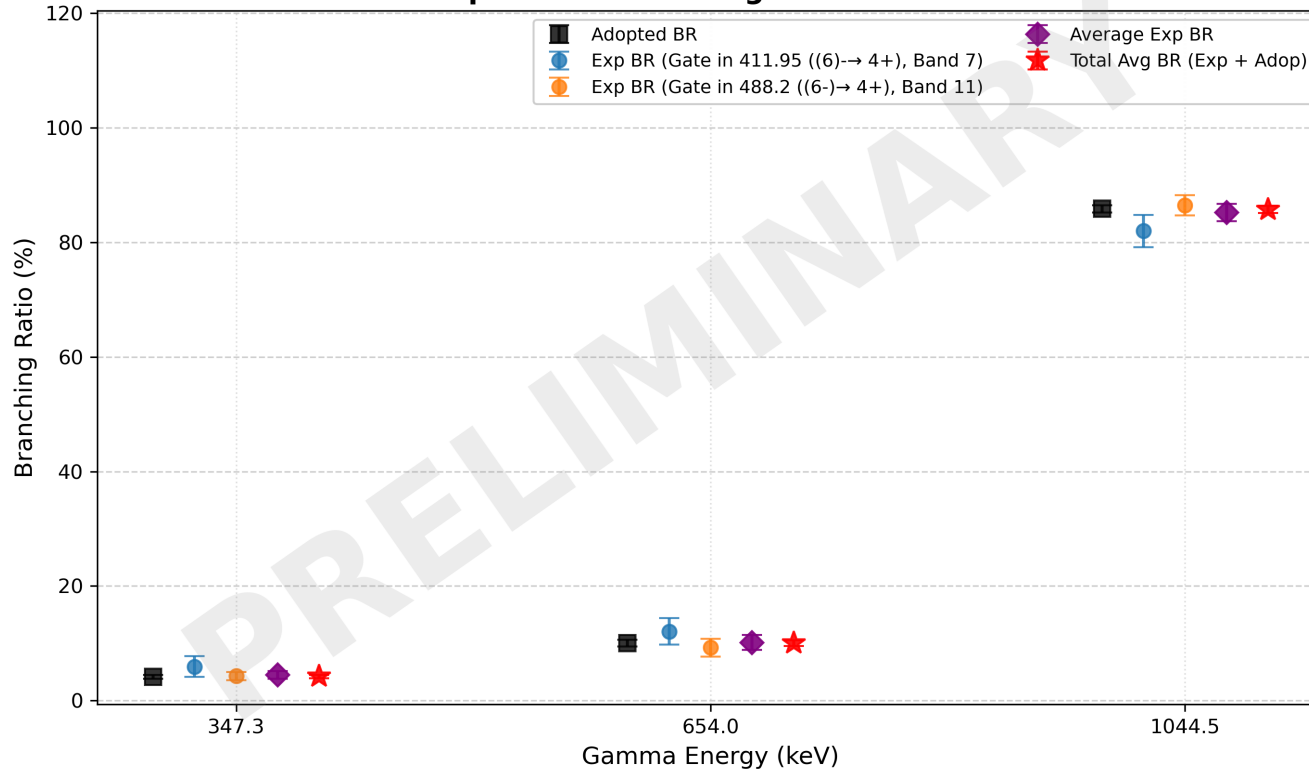
Results

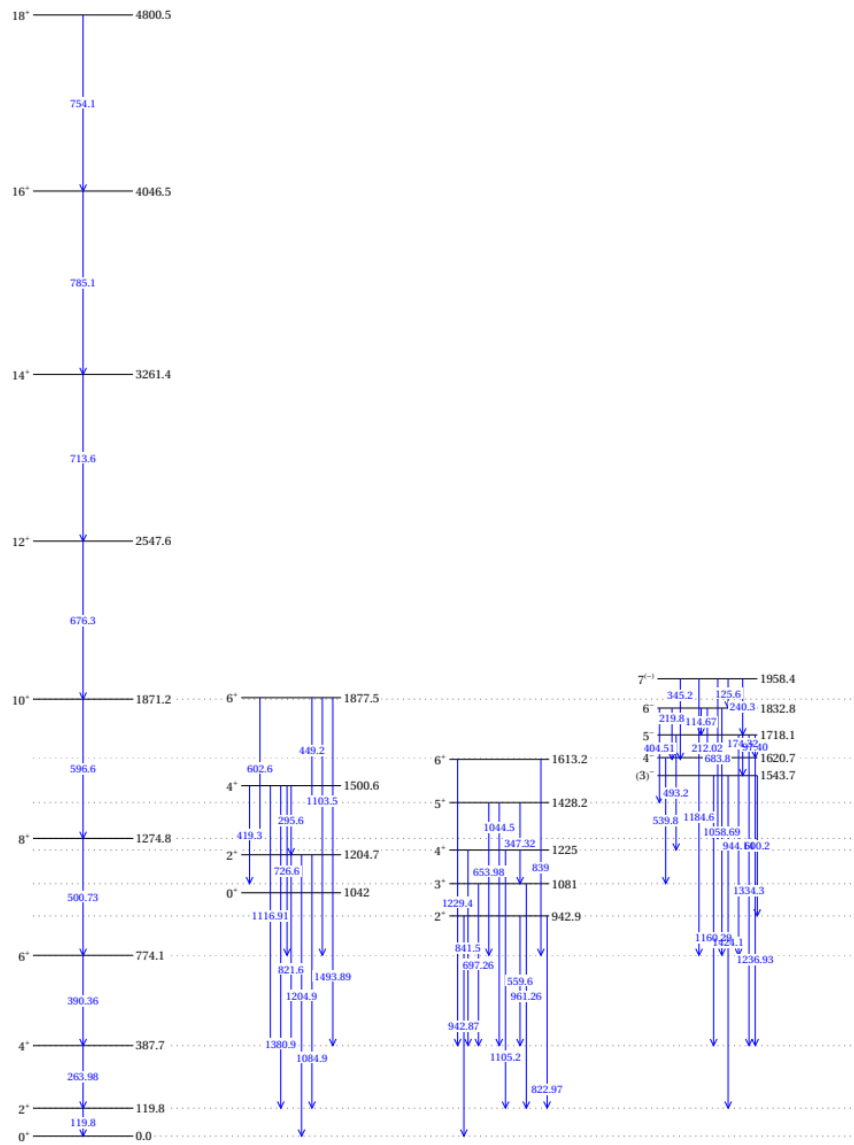
184Os β -band - Branching Ratios for 2+ level



Results

184Os γ -band - Branching Ratios for 5+ level





Conclusion

- The experiment successfully populated the states of interest of ^{184}Os
- The branching ratios will add to the scatter known data and reveal more about the nuclear structure of the nucleus