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NUSTRAP
Nuclear Structure, Reactions & Applications

State of spectroscopy analysis in ^{176,177}Yb and ^{182}W

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Reactions and experimental details

The experiment was conducted at the 9MV Tandem Accelerator at IFIN-HH, in Măgurele, Romania using the RoSPHERE array.

Coulomb excitation reaction

$$^{176}Yb(\ ^{9}Be,\ ^{9}Be')^{176}Yb^{*}$$

Single-neutron transfer reaction

$$^{176}Yb(\ ^{9}Be,\ ^{8}Be\ \ )^{177}Yb^{*}$$

Fusion-evaporation reaction

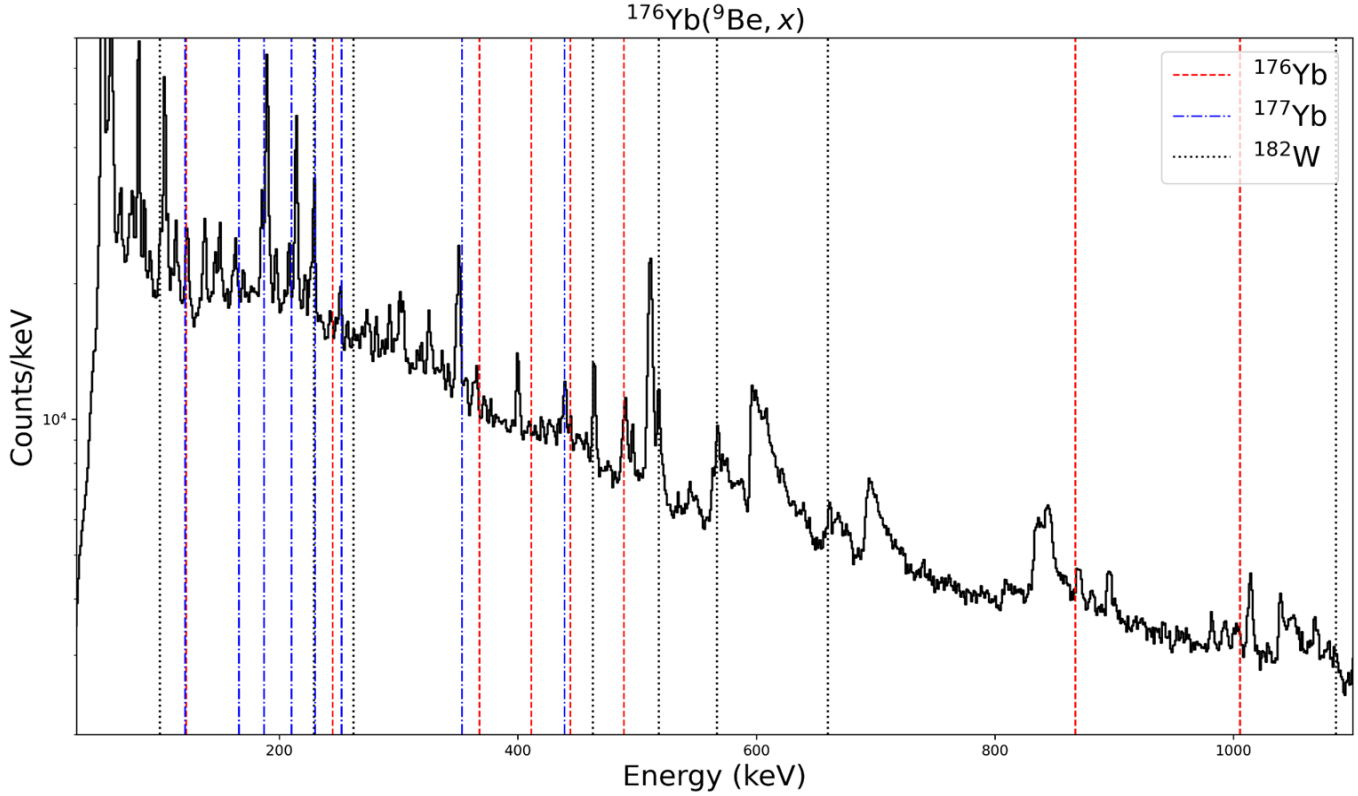
$$^{176}Yb(\ ^{9}Be,3n)^{182}W^{*}$$

Beam energy at 38MeV

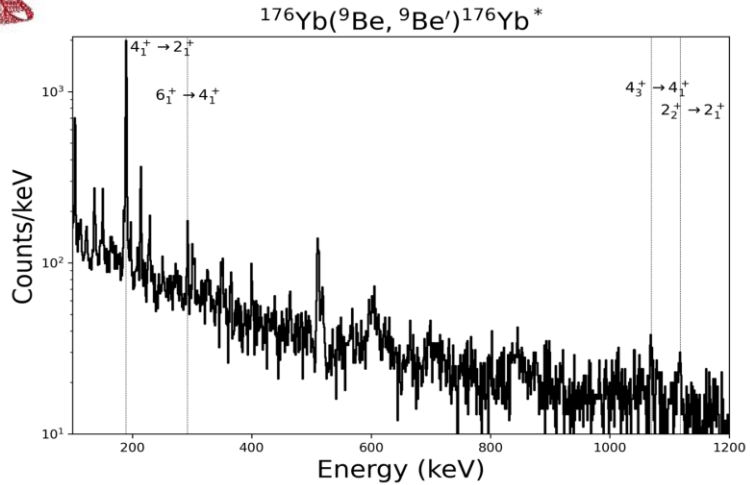
Main Goal

- The aim is to reconstruct the level schemes using the NuDat database as the reference source.
- Calculate the experimental $R_{4/2}$

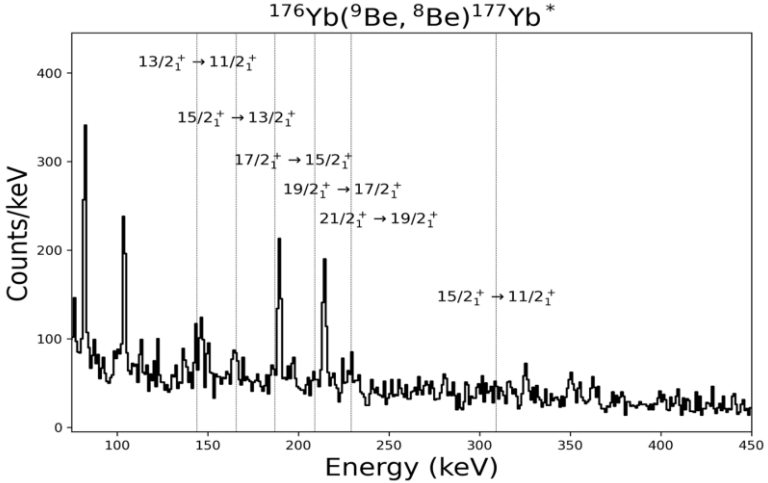
Total ungated gamma ray spectrum

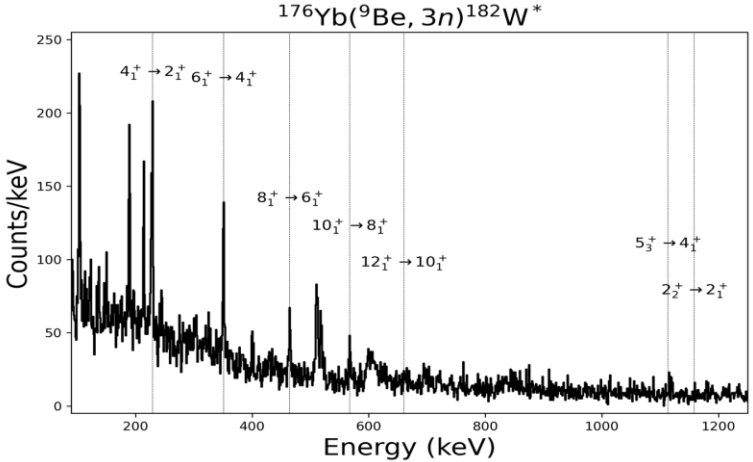


Spectrum gated on the $2_1^+ \rightarrow 0_1^+$ of ^{176}Yb



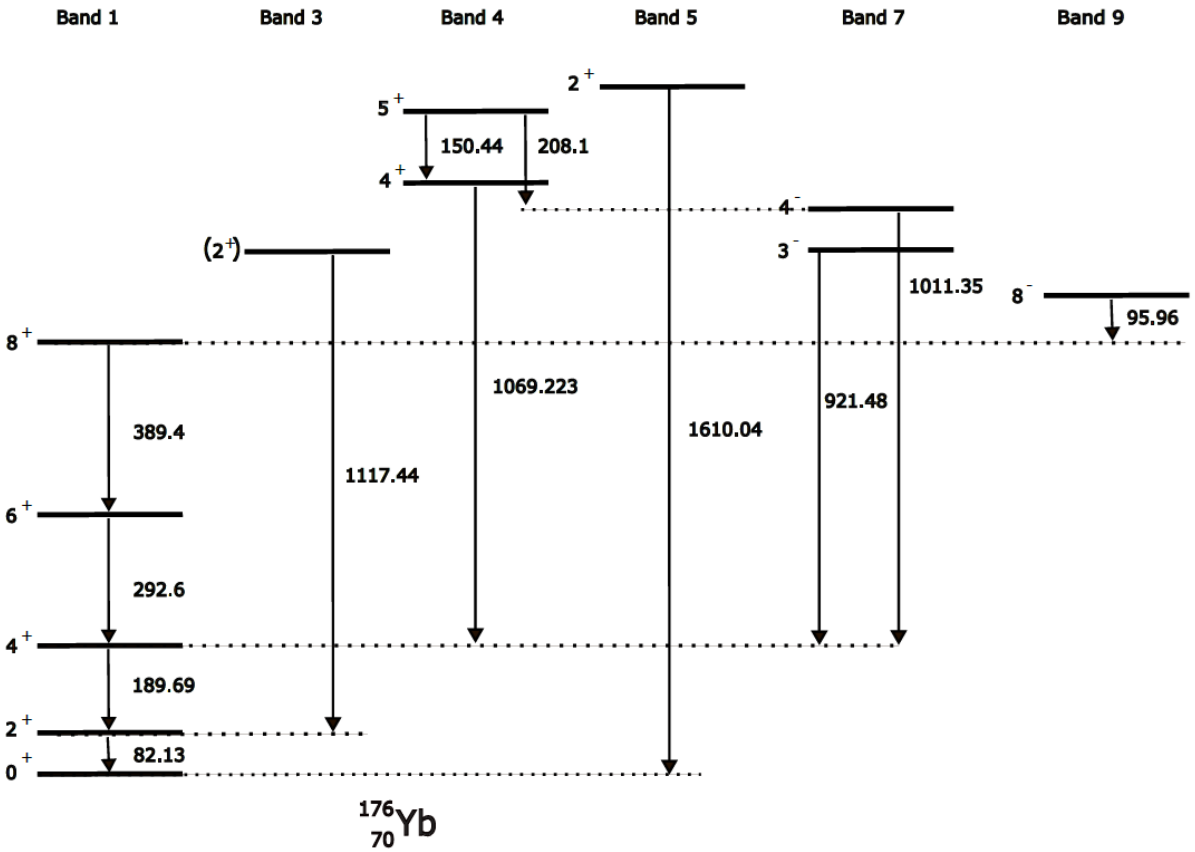
Spectrum gated on the $11^+/2_1 \rightarrow 9^+/2_1$ of ^{177}Yb



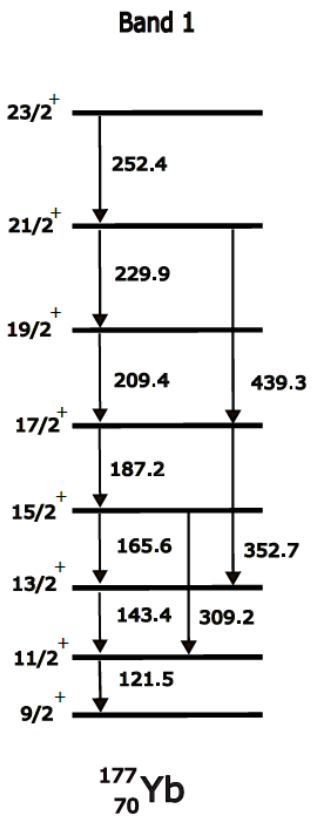


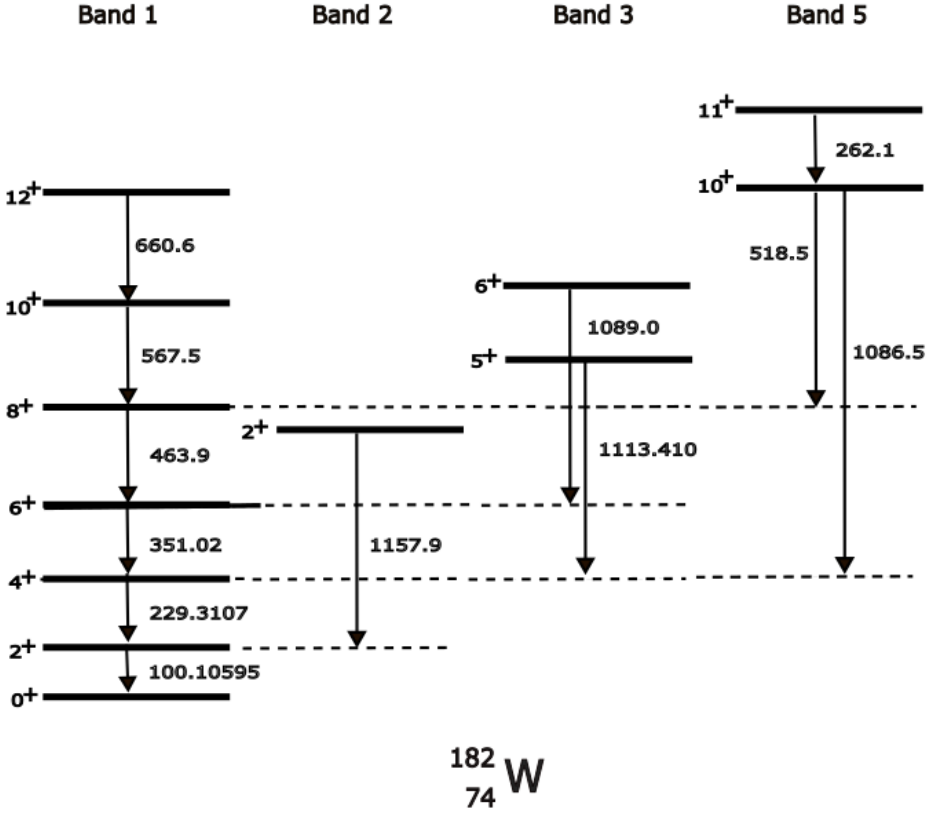
Spectrum gated on the $2_1^+ \rightarrow 0_1^+$ of ^{182}W

Preliminary results: Level scheme of ^{176}Yb



Preliminary results: Level scheme of ^{177}Yb and ^{182}W





Conclusions

^{176}Yb

- $R_{4/2}$= 3.308 (1) **deformed nucleus.**
- Theoretical value $R_{4/2}$ = 3.312

^{182}W

- $R_{4/2}$= 3.278 (2) **deformed nucleus.**
- Theoretical value $R_{4/2}$= 3.291

- Gamma-ray spectroscopy was used to construct the level schemes using known excited state energies from NuDat, with **no new excited states or transitions** identified.
- The results confirm rotational behavior for ^{176}Yb, ^{182}W and a single particle structure for ^{177}Yb.