Spherical and deformed structures in ^{189}Pb

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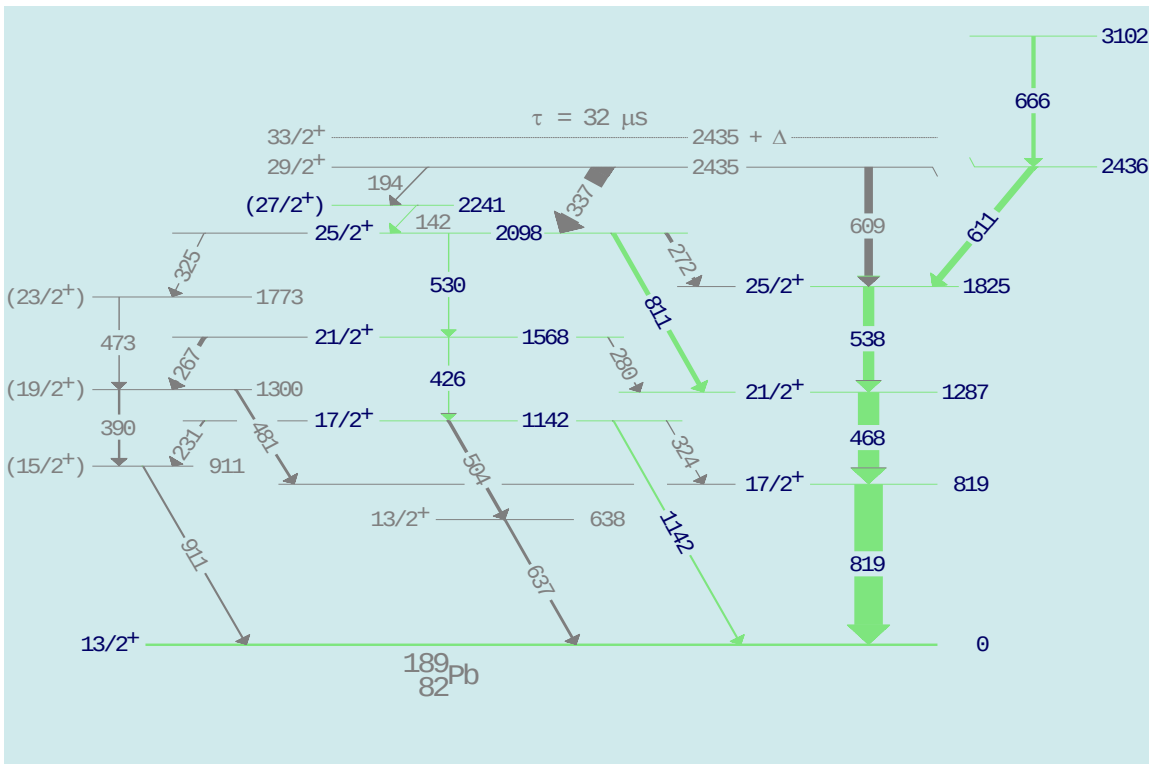
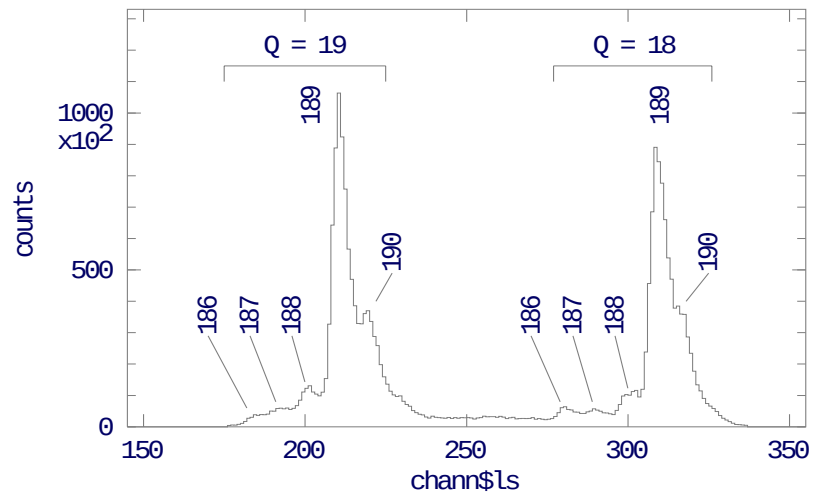
Prompt decays

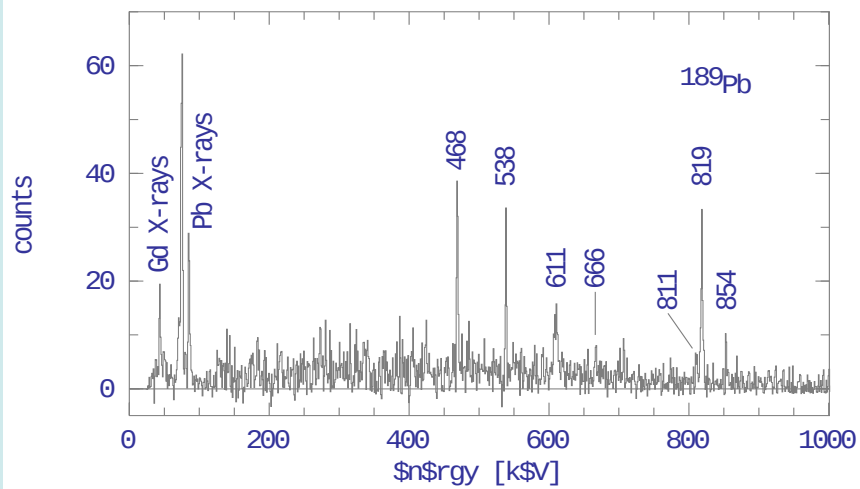
- ^{158}Gd(^{36}Ar,5n), 178.5 MeV at Argonne.
- Mass identification of recoils with FMA



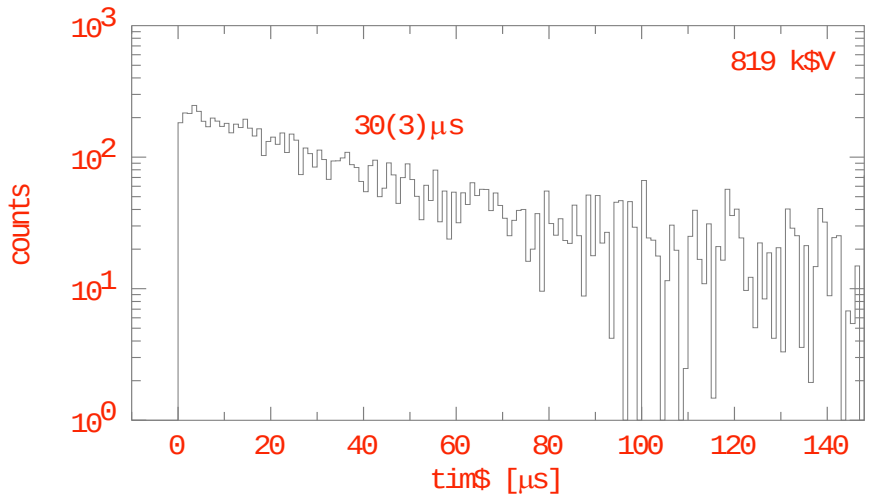
Mass spectrum



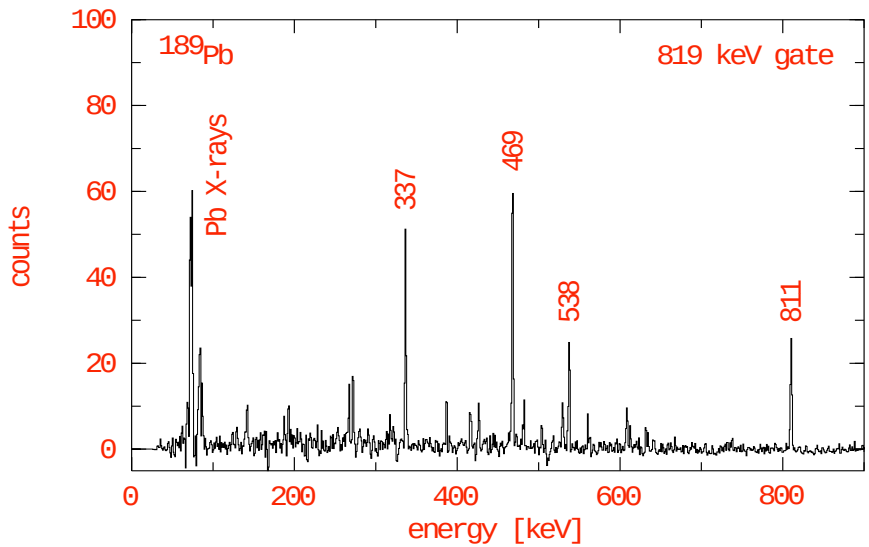
Recoil gated γ-γ

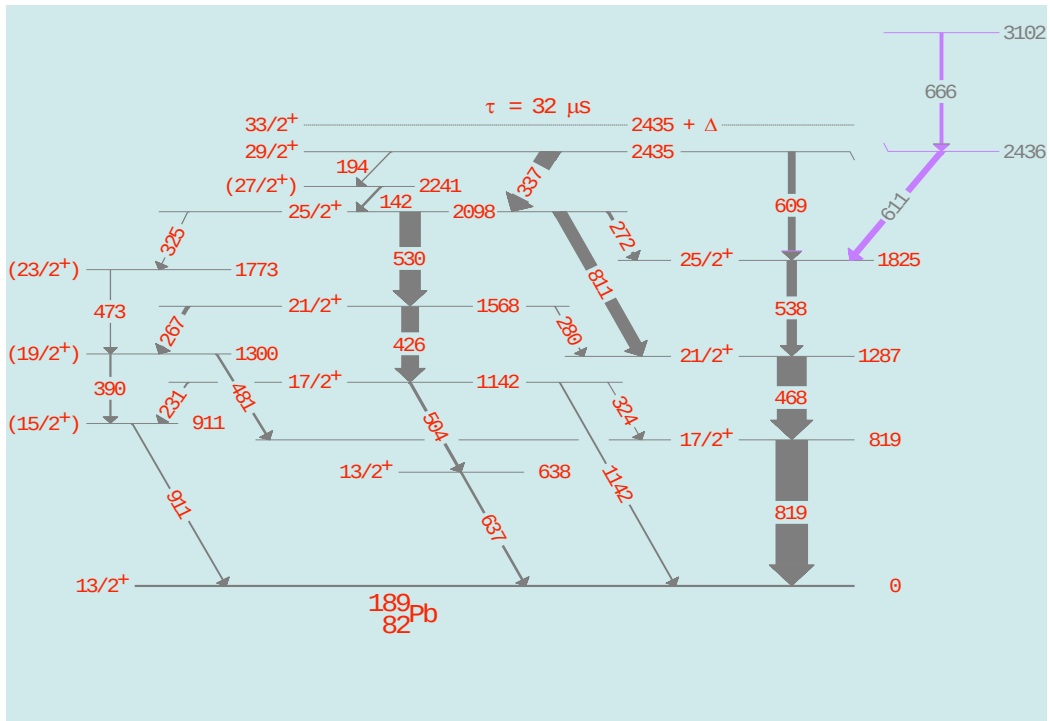


Decays below isomer



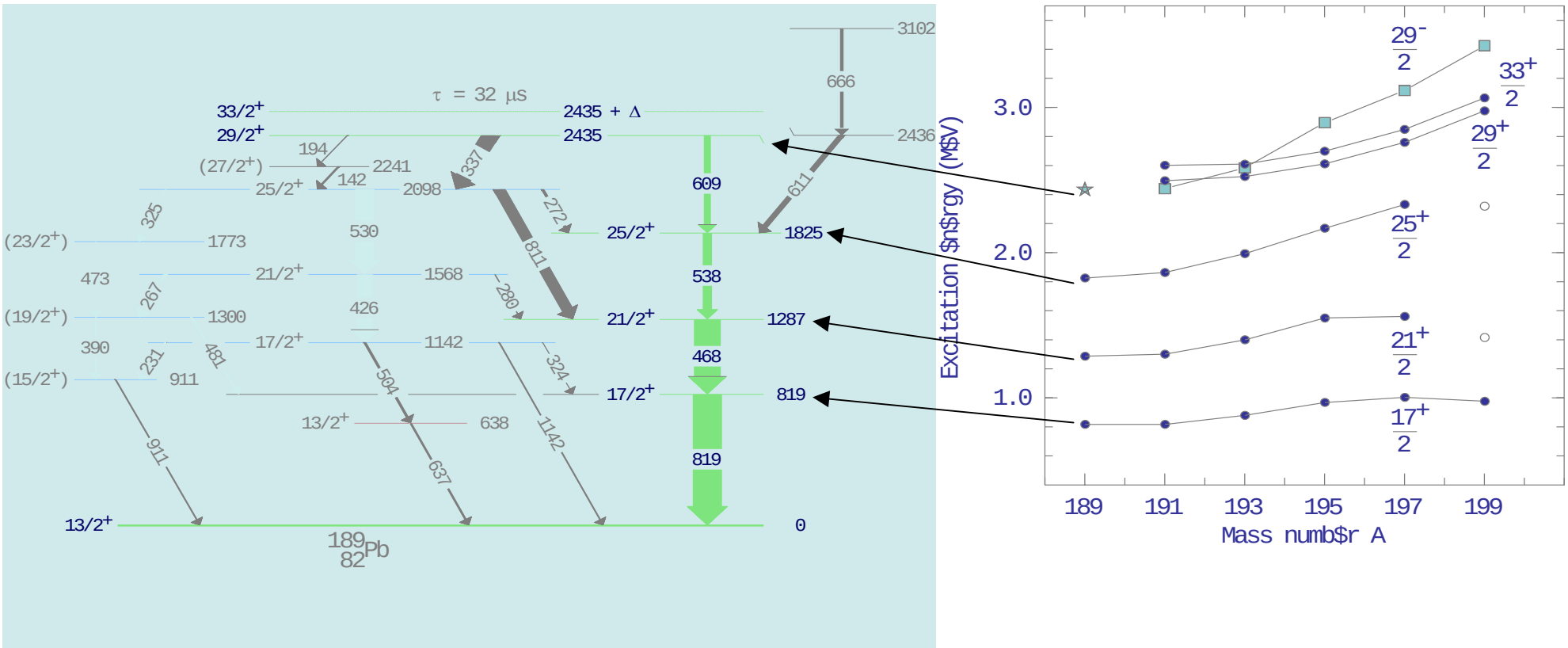
- ^{164}Er(^{29}Si,4n), 140 MeV at Canberra
- Pulsed beams



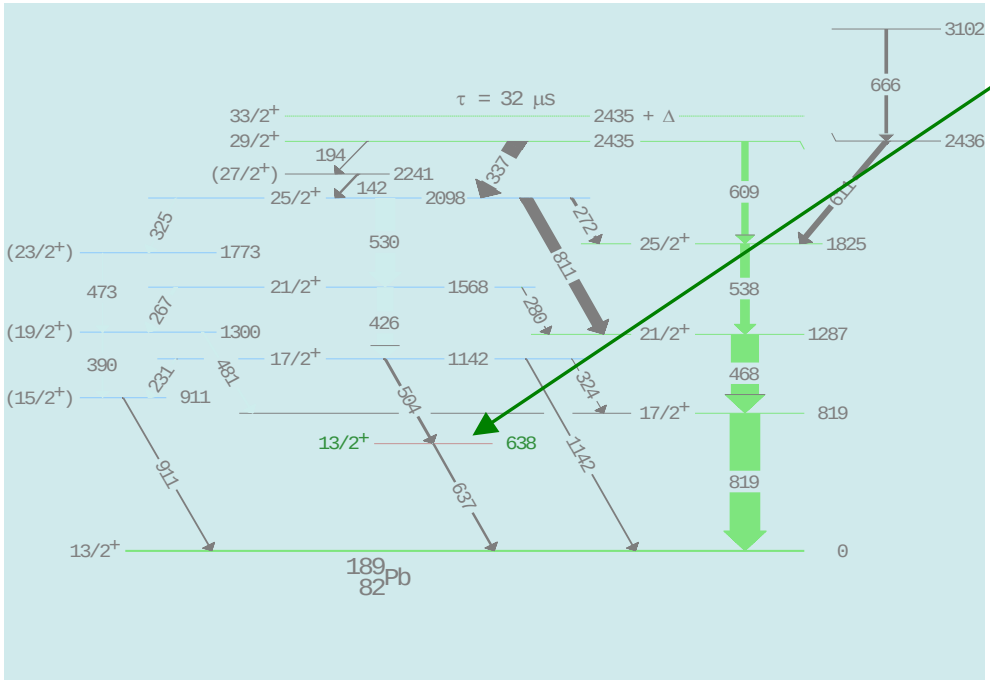


Spherical states and the 32 μs isomer

Assignments made using systematic trends of members of $\nu(i_{13/2})^{-3}$ multiplet in heavier odd-*A*, Pb isotopes.



Oblate state

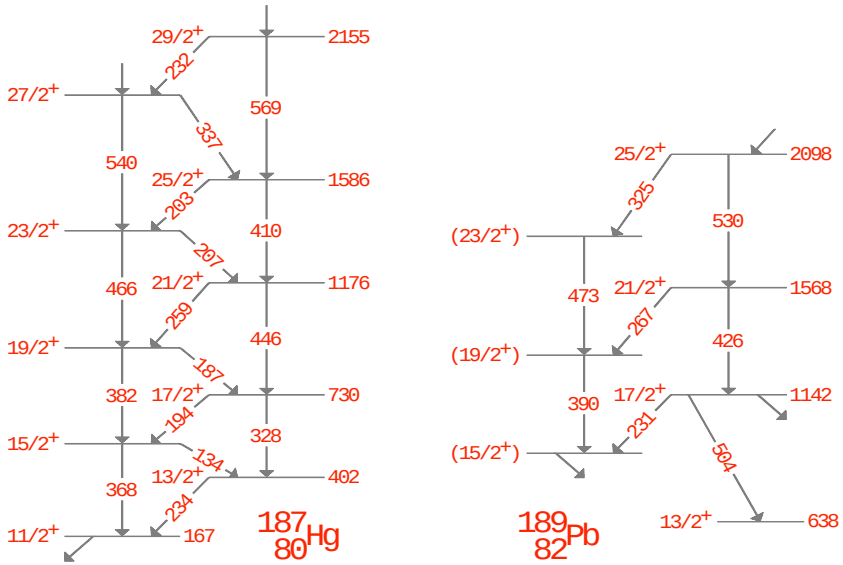


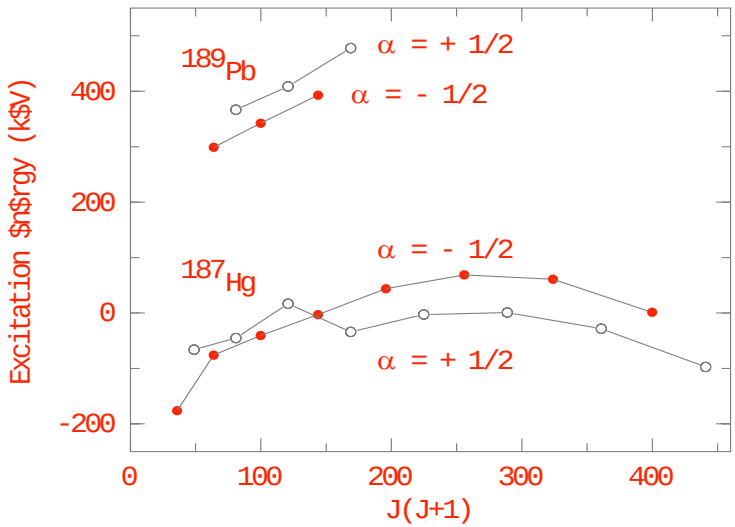
- Level at 638 keV identified with a state at the same energy seen in α decay of ^{193}Po by Van de Vel *et al*. *.
  They assigned it $13/2^+$ from E0 component in 637-keV decay and attribute it to coupling of an $i_{13/2}$ neutron to oblate 0^+ $\pi(2p\text{-}2h)$ excitation in core.
  Oblate shape supported by PES calculations.

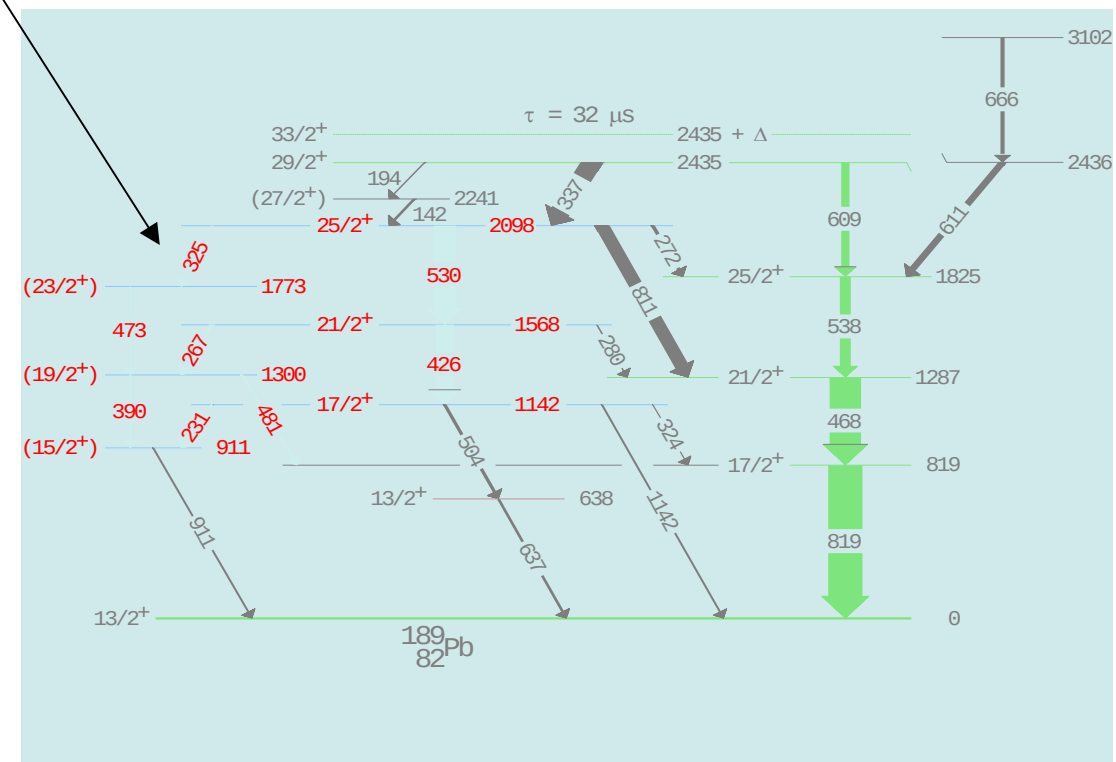
*Van de Vel et al.
Phys. Rev. C 65 064301 (2002)

Prolate band

Assignment from comparison with “mixed $i_{13/2}$” band in isotone ^{187}Hg.

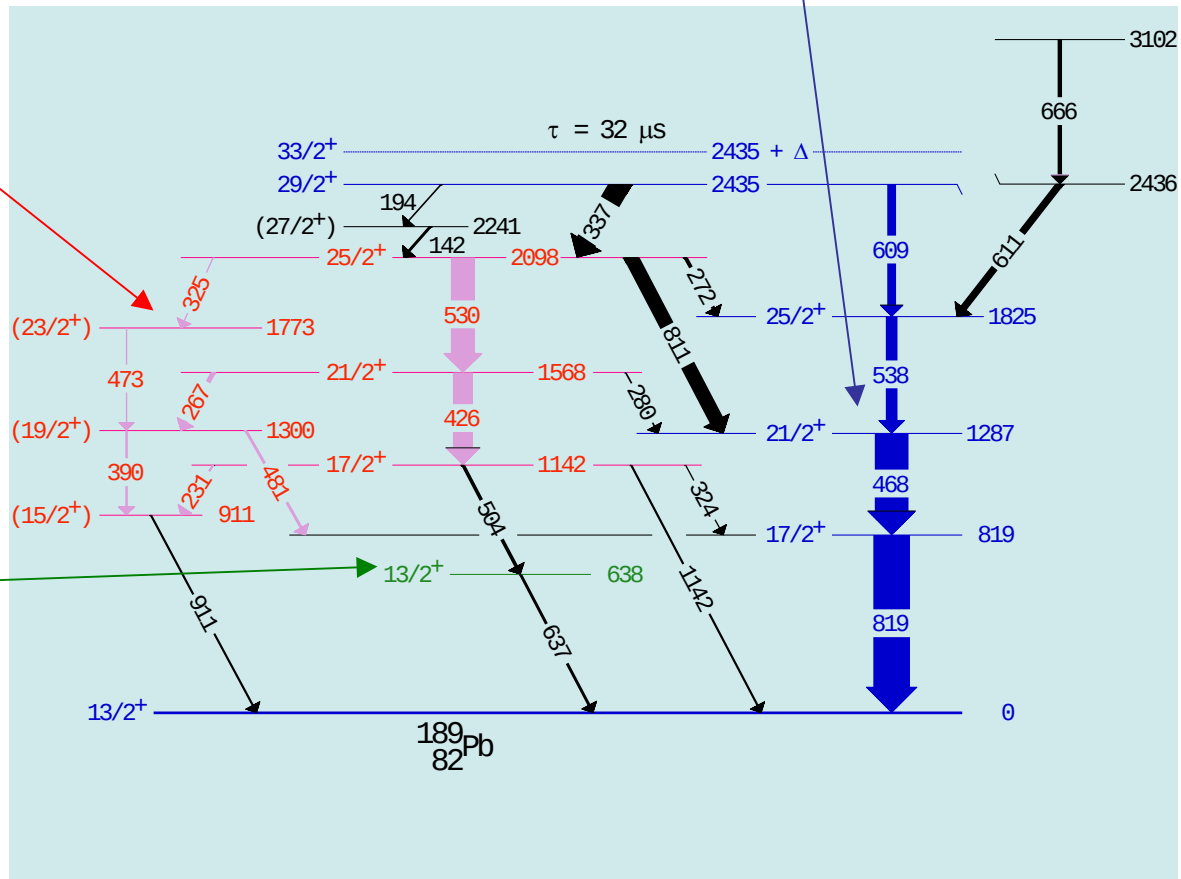






Summary

Prolate band
From similarity to
"mixed $i_{13/2}$" band in ^{187}Hg

Spherical states
From systematics in
odd-A Pb isotopes

Oblate state
$\nu(\iota_{13/2})$ coupled to
$\pi(2p\text{-}2h)$ oblate
intruder