

# New Results Concerning Collective Motion in Triaxial Nuclei

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## 1 Nuclear Shapes

# Nuclear Deformation

Most of the nuclei are either *spherical* or *axially symmetric* in their ground-state.

Deformation parameter  $\beta$  (Bohr, 1969): preserves axial symmetry

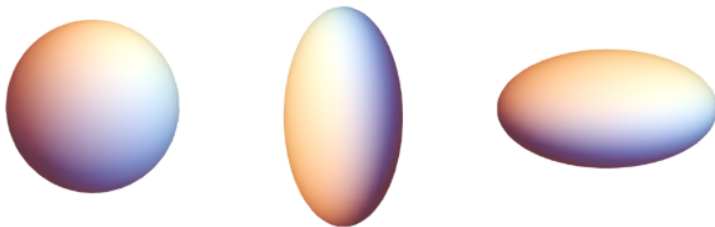


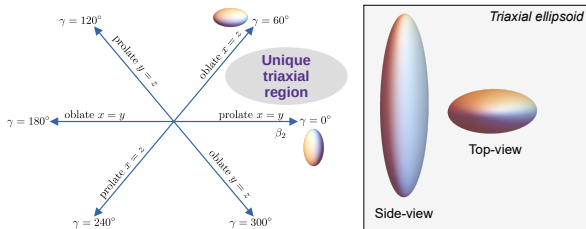
Figure 1: **spherical:**  $\beta = 0$  **prolate:**  $\beta > 0$  **oblate:**  $\beta < 0$

# Nuclear Triaxiality

## Non-axial shape

Deviations from symmetric shapes can occur across the chart of nuclides → **triaxial nuclei**.

The triaxiality parameter  $\gamma$  (*Bohr, 1969*): departure from axial symmetry



**Figure 2:** The  $(\beta, \gamma)$  plane divided into six equivalent parts, depicting nuclear surfaces.

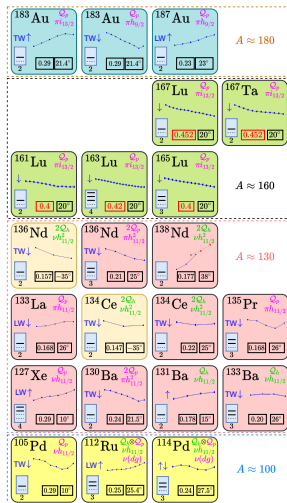
# Fingerprints for Triaxiality

- Experimental measurements represent a real challenge
- Clear signatures for confirming triaxiality in nuclei
  - ① Chiral symmetry breaking (*Frauendorf, 1997*)
  - ② **Wobbling motion** (*Bohr & Mottelson, 1975*)

## Wobbling Motion (WM)

- Unique to non-axial nuclei
- Predicted 50 years ago for even- $A$  nuclei
- First experimental evidence for  $^{163}\text{Lu}$  (*Ødegård, 2001*)
- Currently: confirmed wobblers within the mass regions  $A \approx [100, 130, 160, 180]$ .

# Experimental Evidence



Poenaru, 2022, in progress