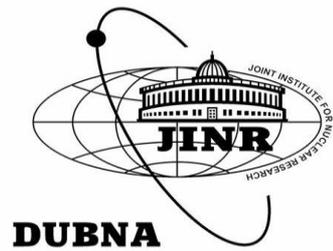




# Study of neutron multiplicity in $^{232}\text{Th}(n,f)$ reaction using TALYS-1.96



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# Outline

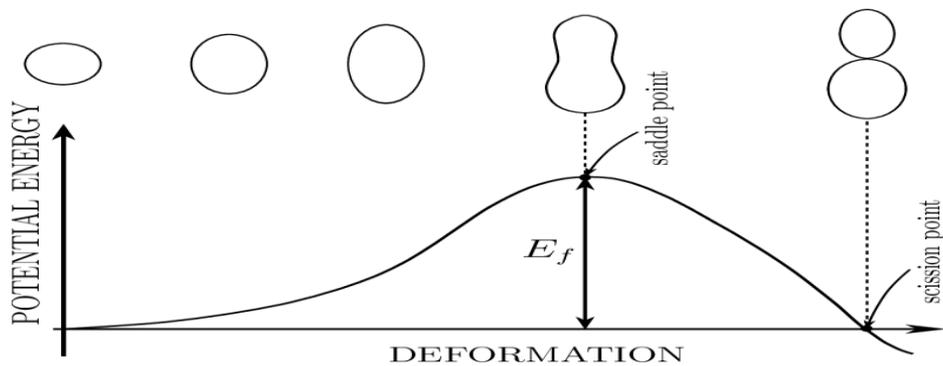
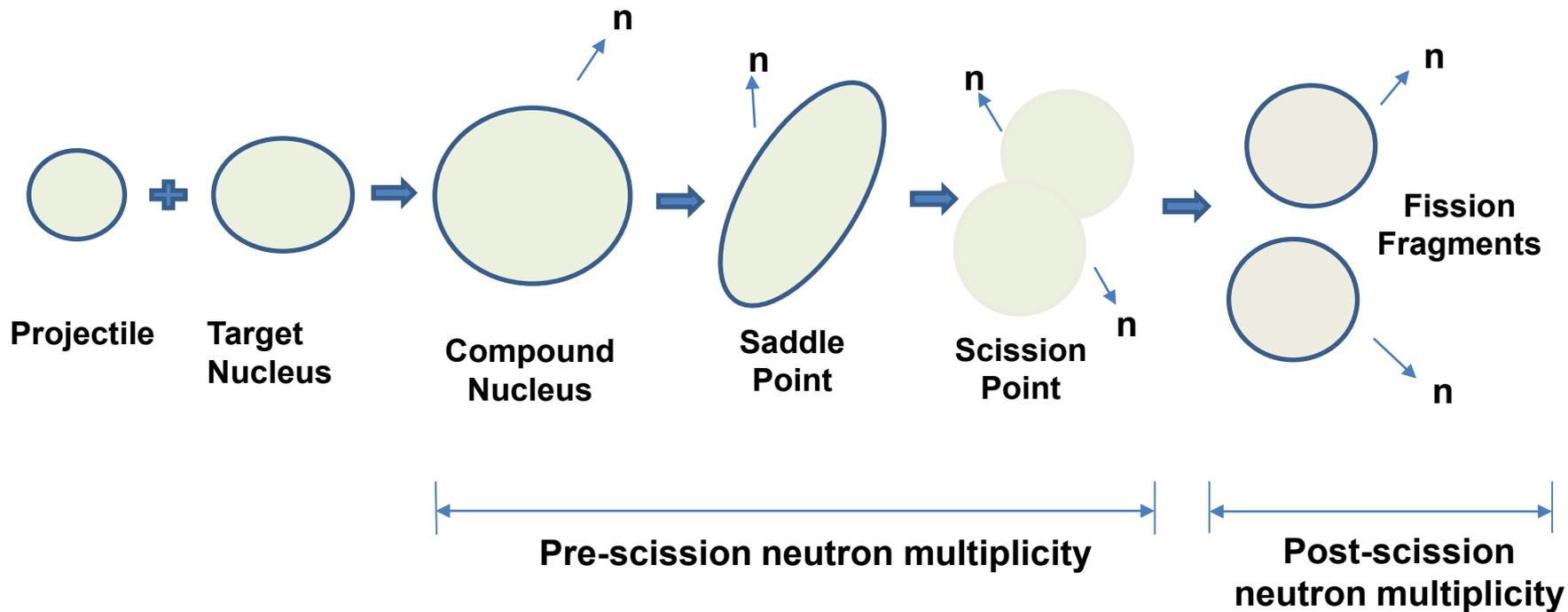
- Introduction**
- Literature Survey**
- Current Problem**
- Conclusion**

# Introduction

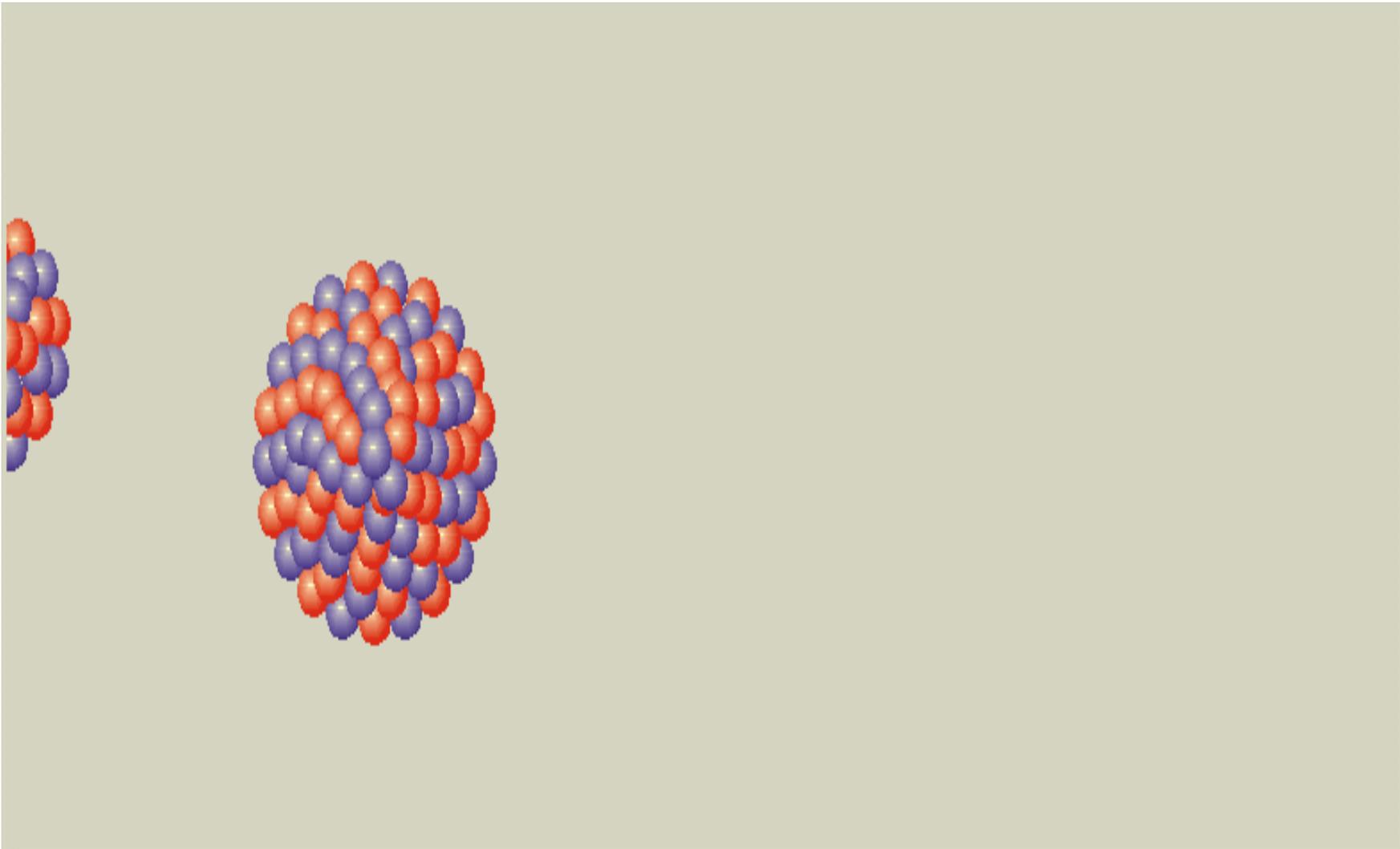
**A nuclear reaction is a process in which two nuclei collide to produce one or more new nuclides.**

## ❖ Types of Nuclear Reactions

- Elastic Scattering
- Inelastic Scattering
- Pickup Reaction
- Stripping Reaction
- Compound Nucleus Reaction
- Radioactive capture
- Photo disintegration



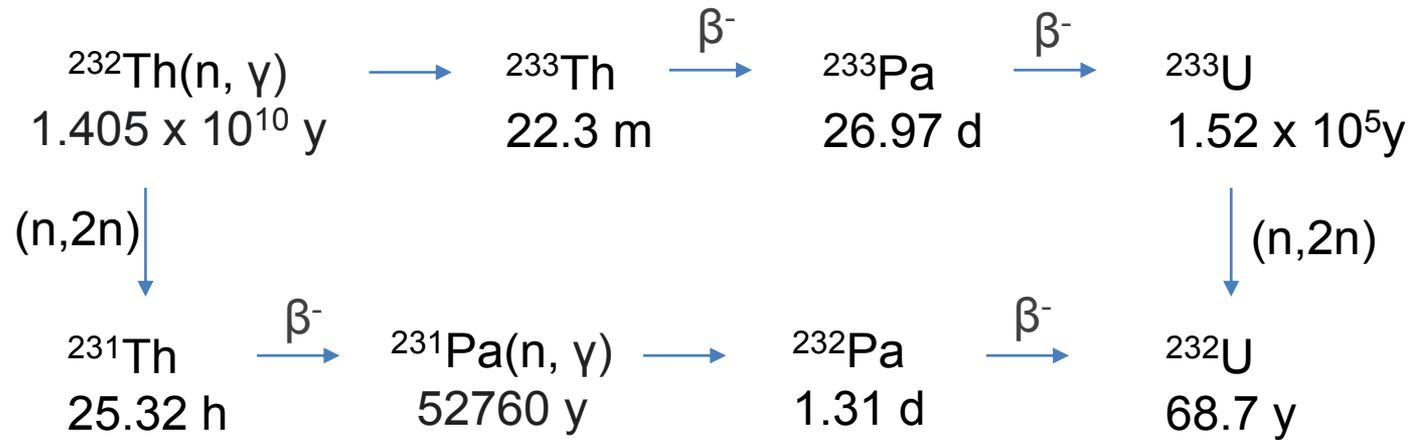
**Decay of fission-fragments from Compound Nucleus**



**This video is taken from JINR Web Browser**

# Literature Survey

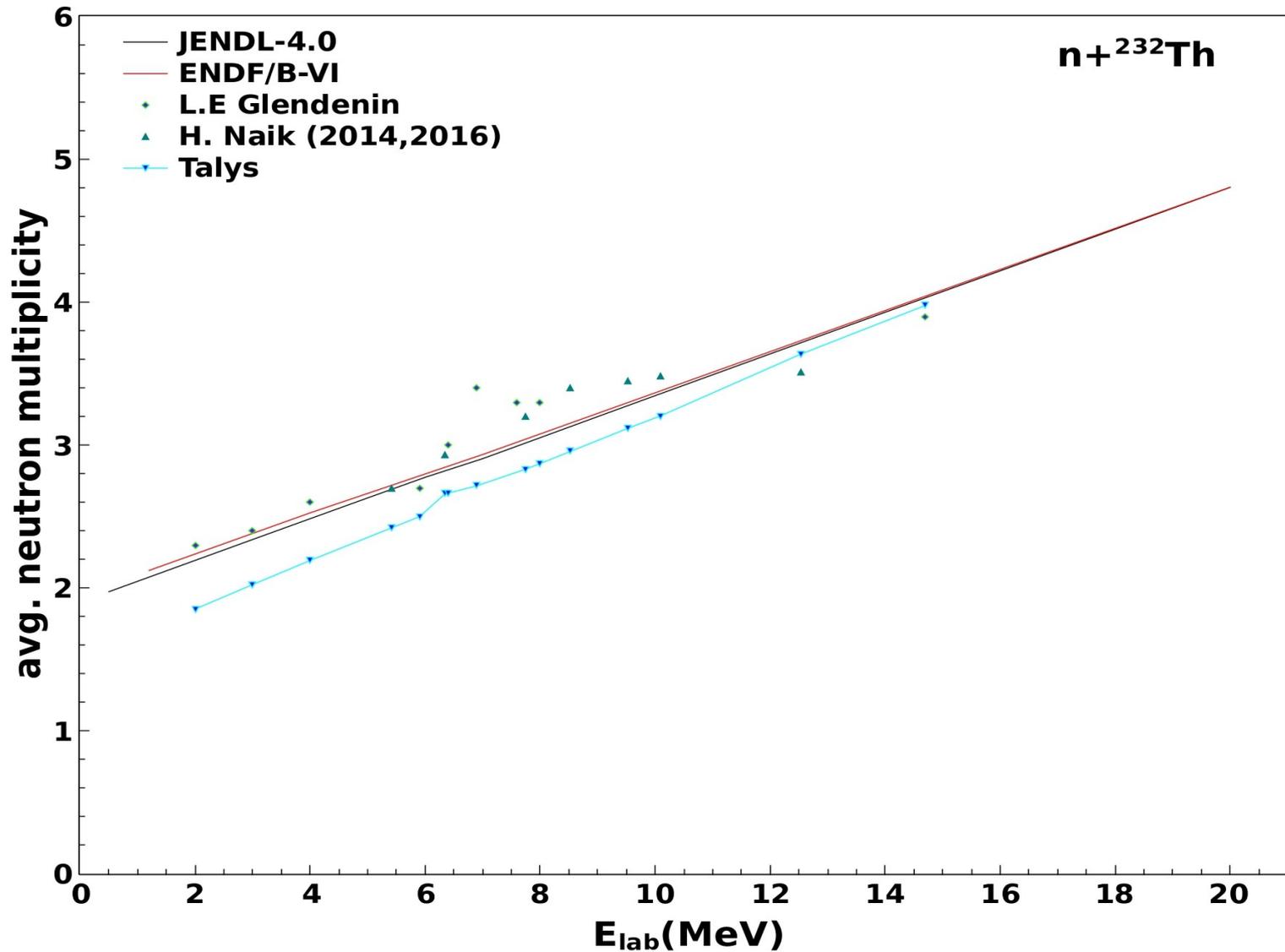
- ❖ Thorium, with a sole isotope  $^{232}\text{Th}$ , is found in nature which is 4 times more abundant than Uranium.
- ❖ India has the highest reserves of thorium in the world as predicted by IAEA and other reports.
- ❖ After capturing a neutron and undergoing consecutive twice beta  $-ve$  decays, the fertile  $^{232}\text{Th}$  can be transferred to fissile  $^{233}\text{U}$ , which is also called the Th-U cycle.
- ❖ Thorium fuel is an attractive way to produce long-term nuclear energy with low radiotoxicity waste.



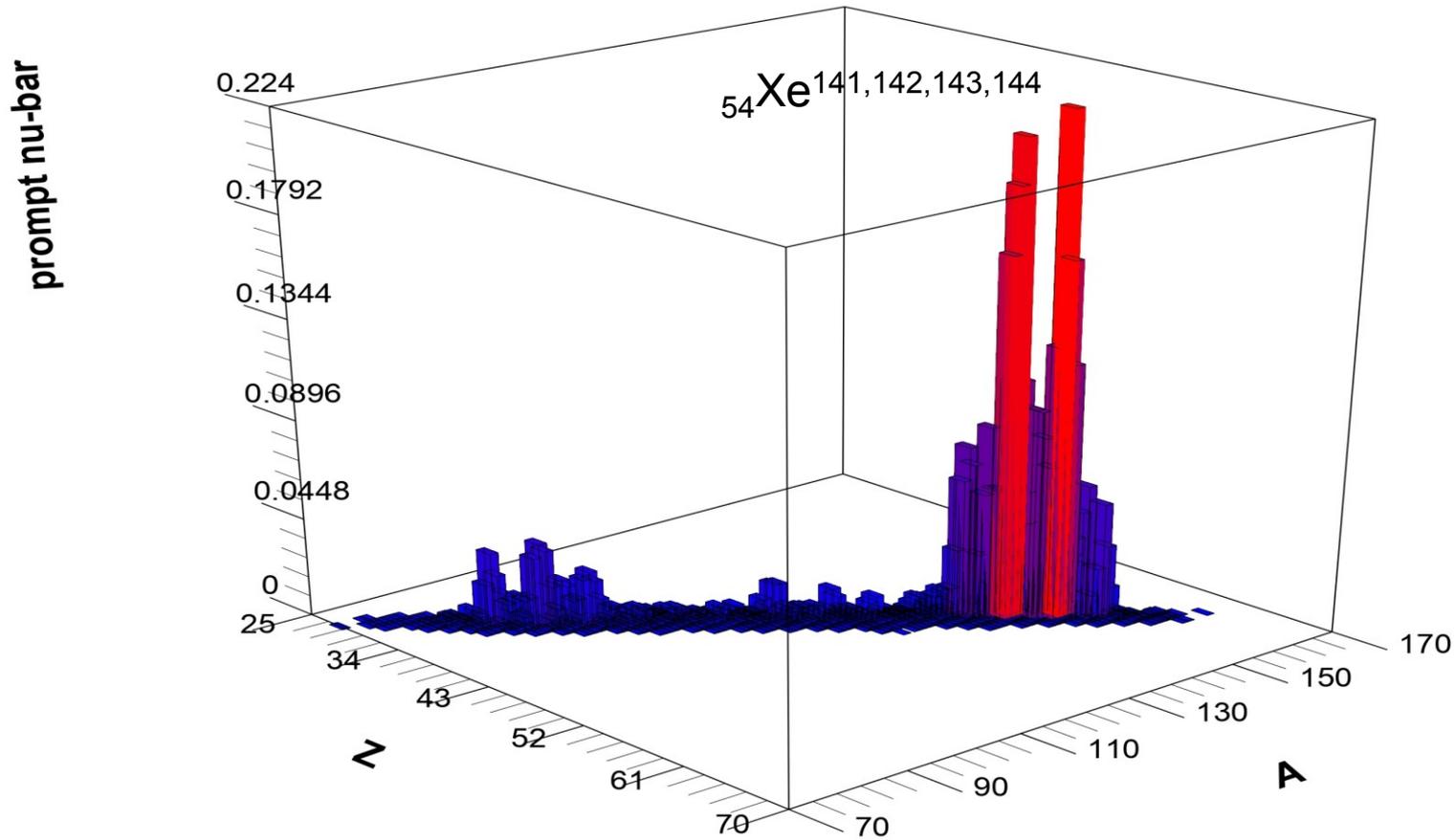
### Th-U cycle

## Current Problem

- Nature of dissipation needs to be determined precisely.
- Nubar at higher energies needs to be explored.



TALYS calculated matches well with available experimental data



A comparison between atomic no. ( $Z$ ), atomic mass ( $A$ ) and prompt neutron multiplicity are shown.

# Conclusion

- Calculated results from TALYS match well with the available experimental data at higher excitation energies.
- Still, we are lacking in experimental data on Nubar at higher excitation energies.
- We are planning to do such experiments in the near future.

# References

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**Thank You**

