22nd ASRC International Workshop
Fission of actinide nuclei using multi-nucleon transfer reactions

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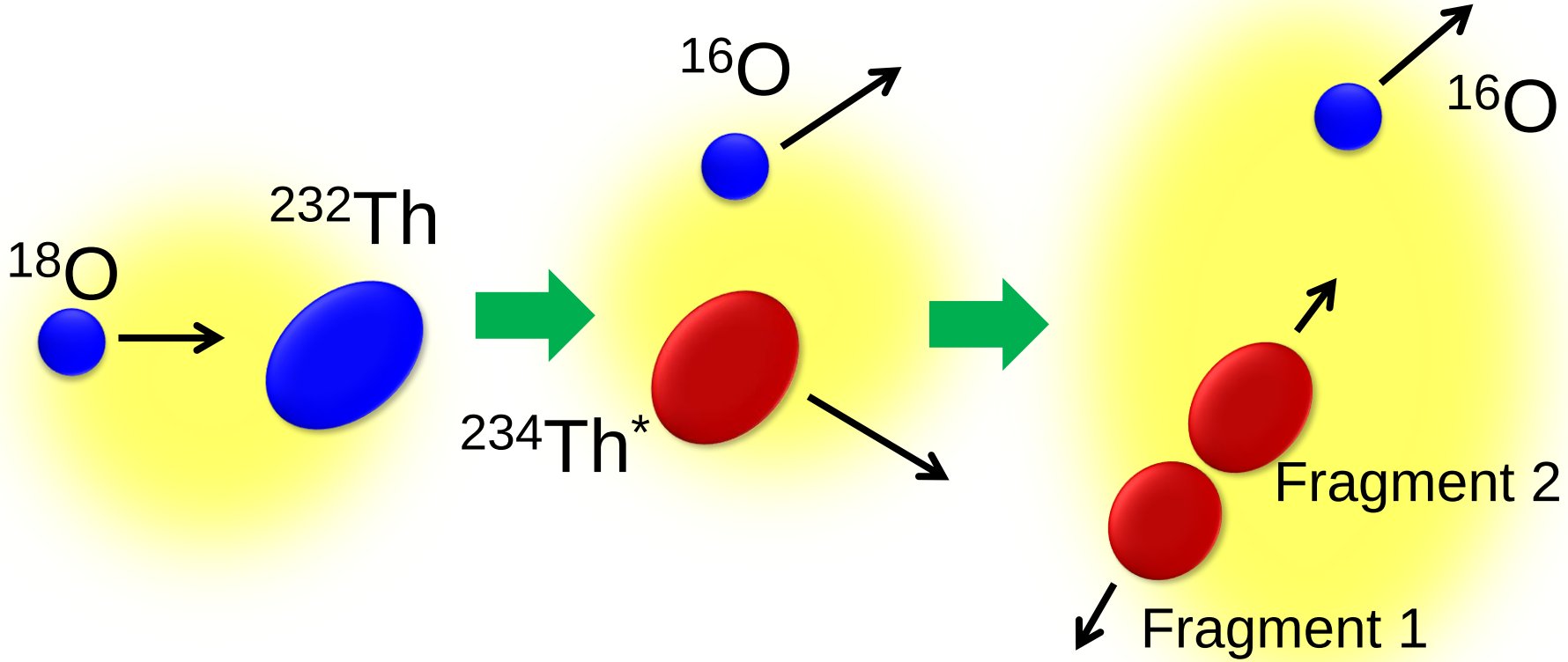
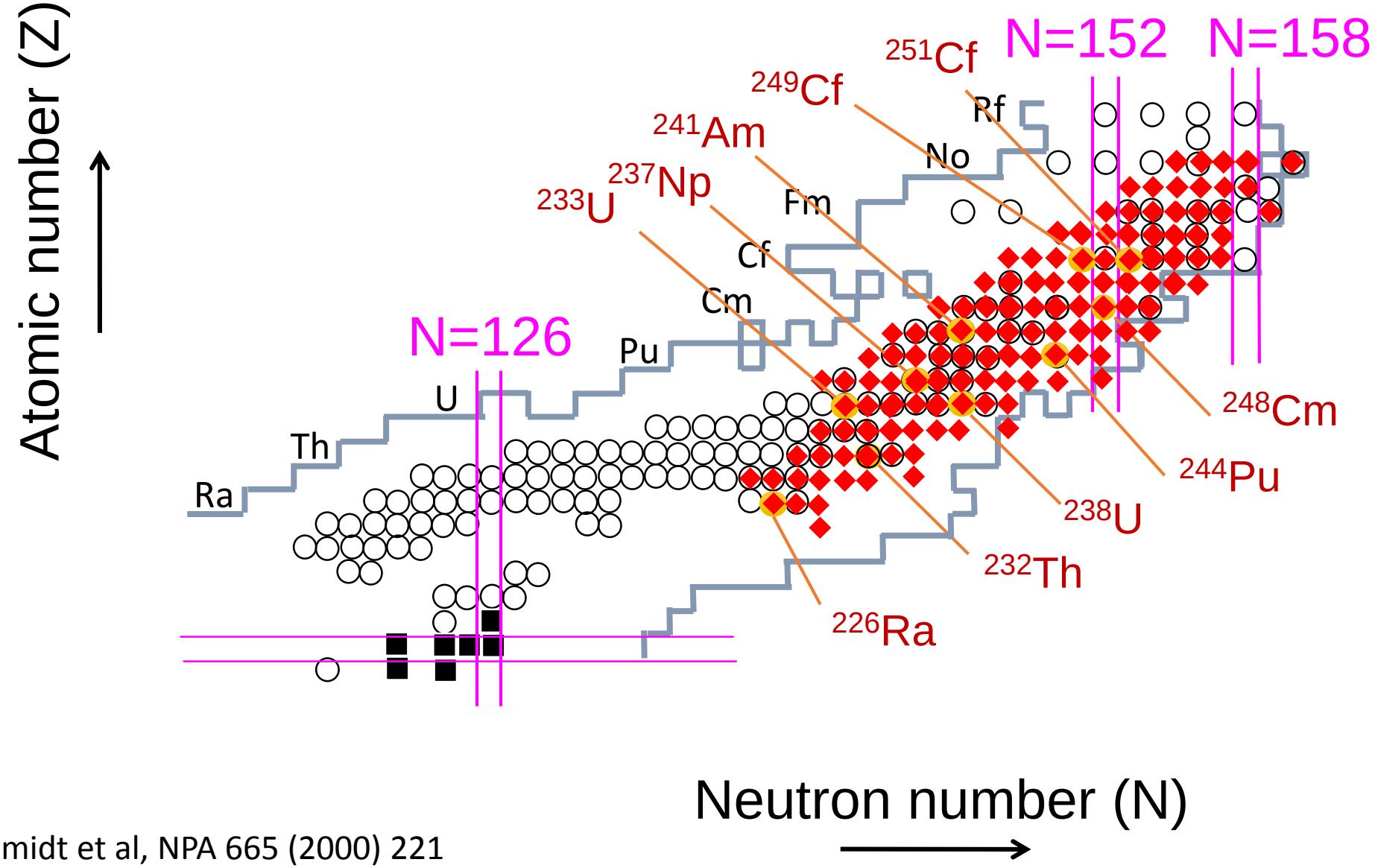
Transfer Reaction

- Fission properties for neutron-rich nuclei



Present status



K.H. Shmidt et al, NPA 665 (2000) 221

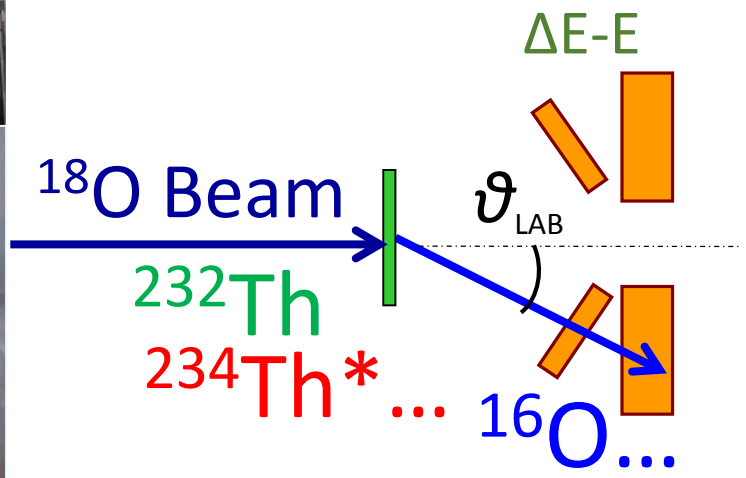
Experimental setup: identification of transfer channel

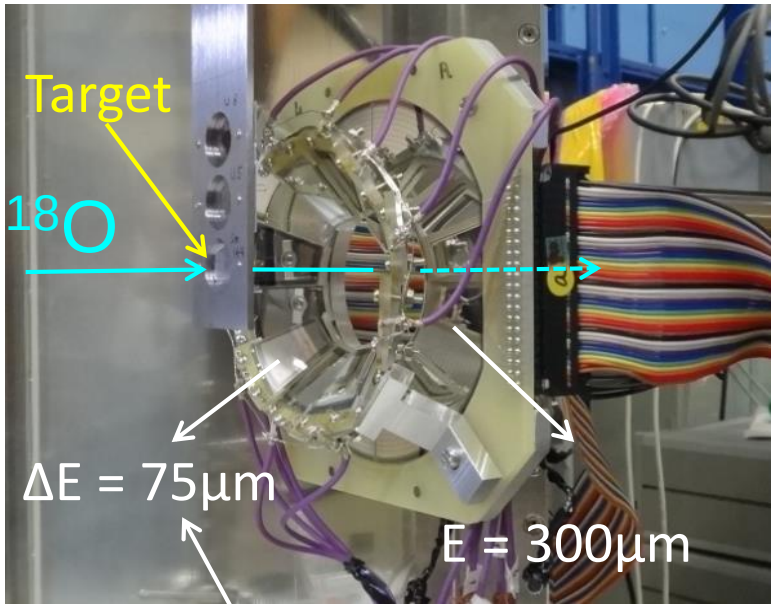
Tandem facility in Tokai

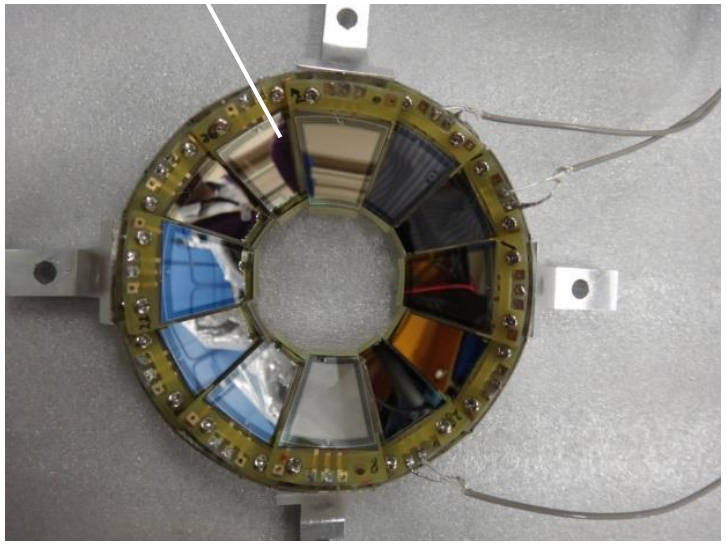
^{18}O: 157.5 MeV

^{232}Th: 148.7 µg/cm2

ΔE-E identification

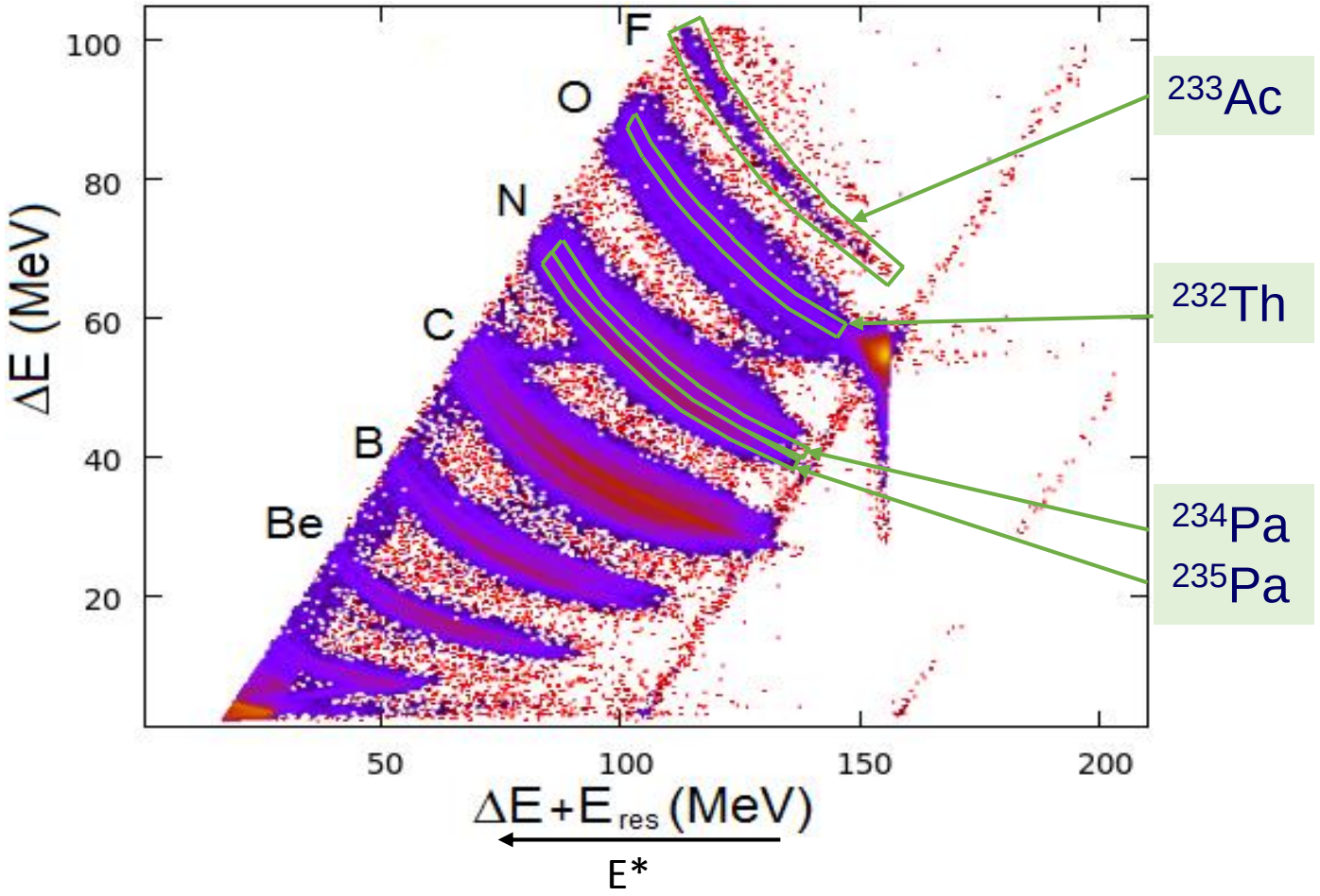




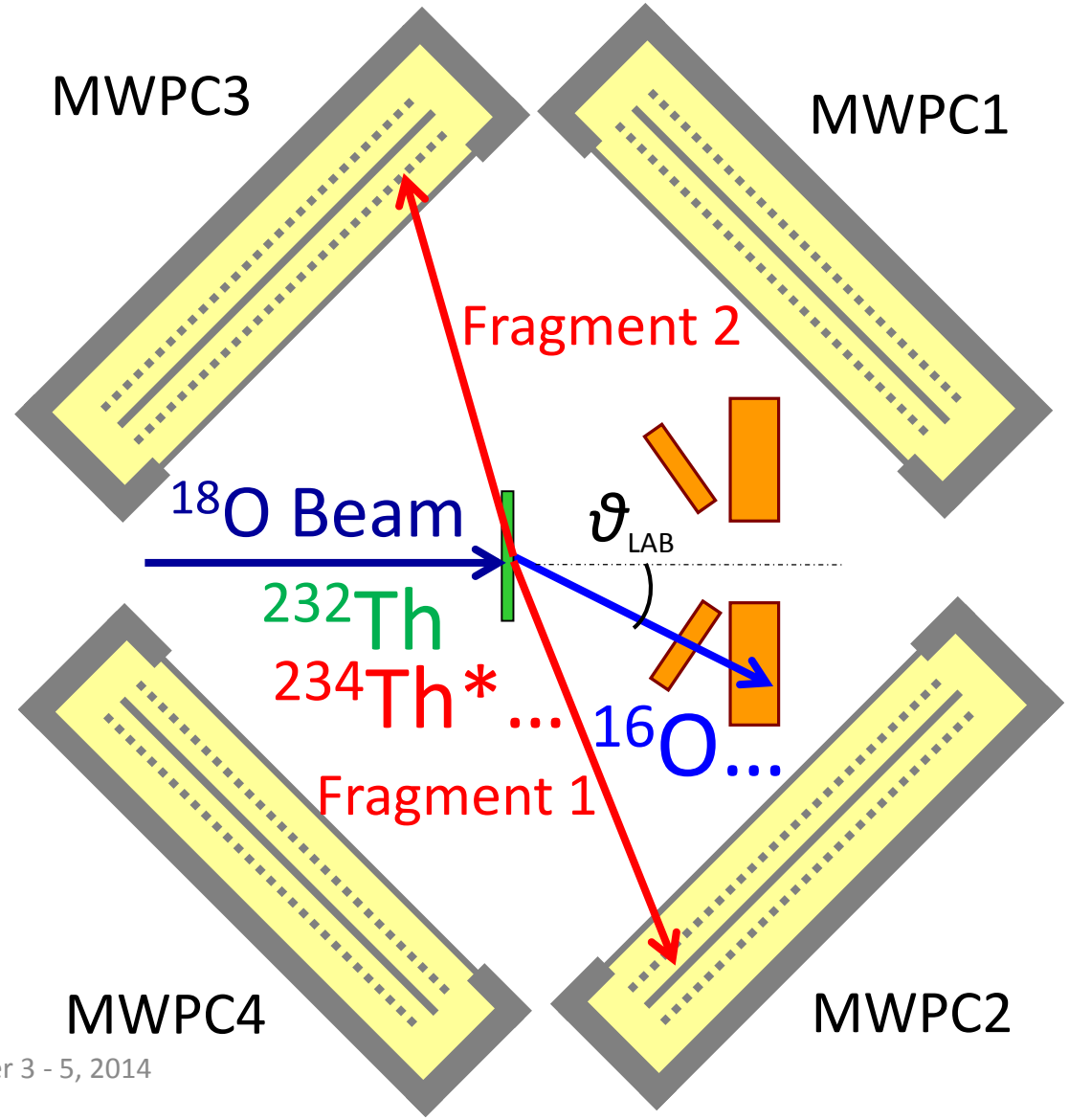


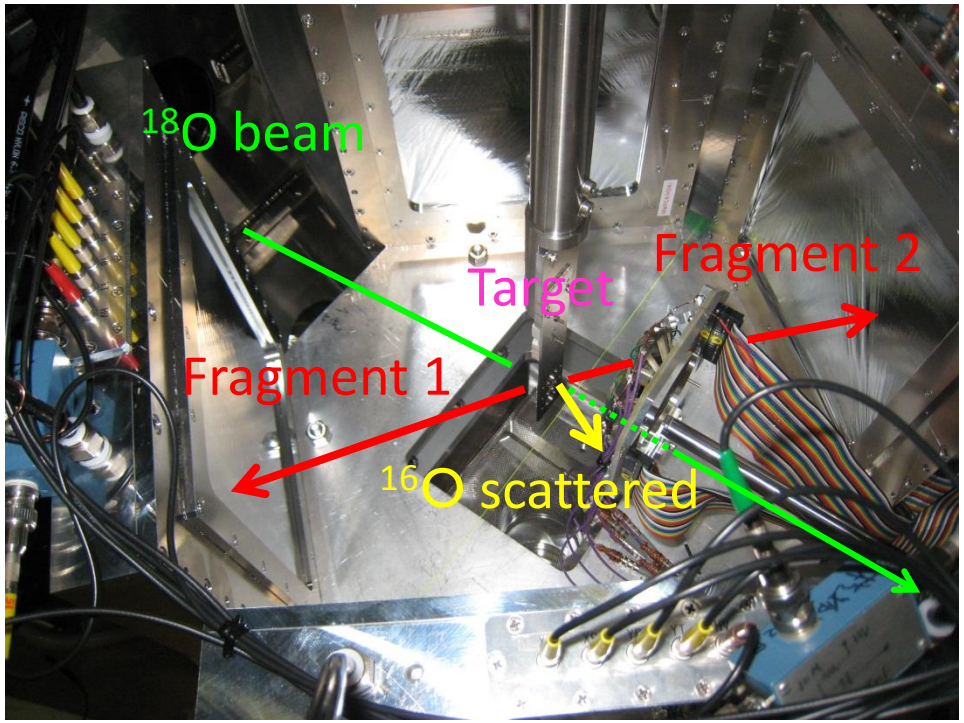
Transfer Reaction: $^{18}O+^{232}Th$

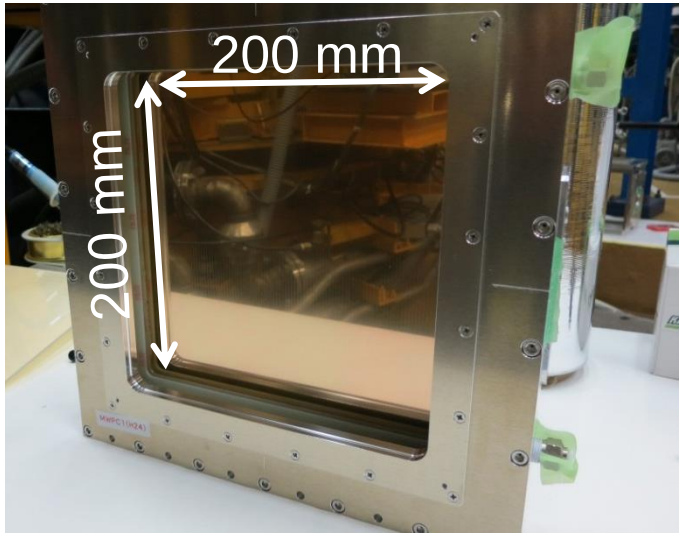
- Fission properties for neutron-rich nuclei



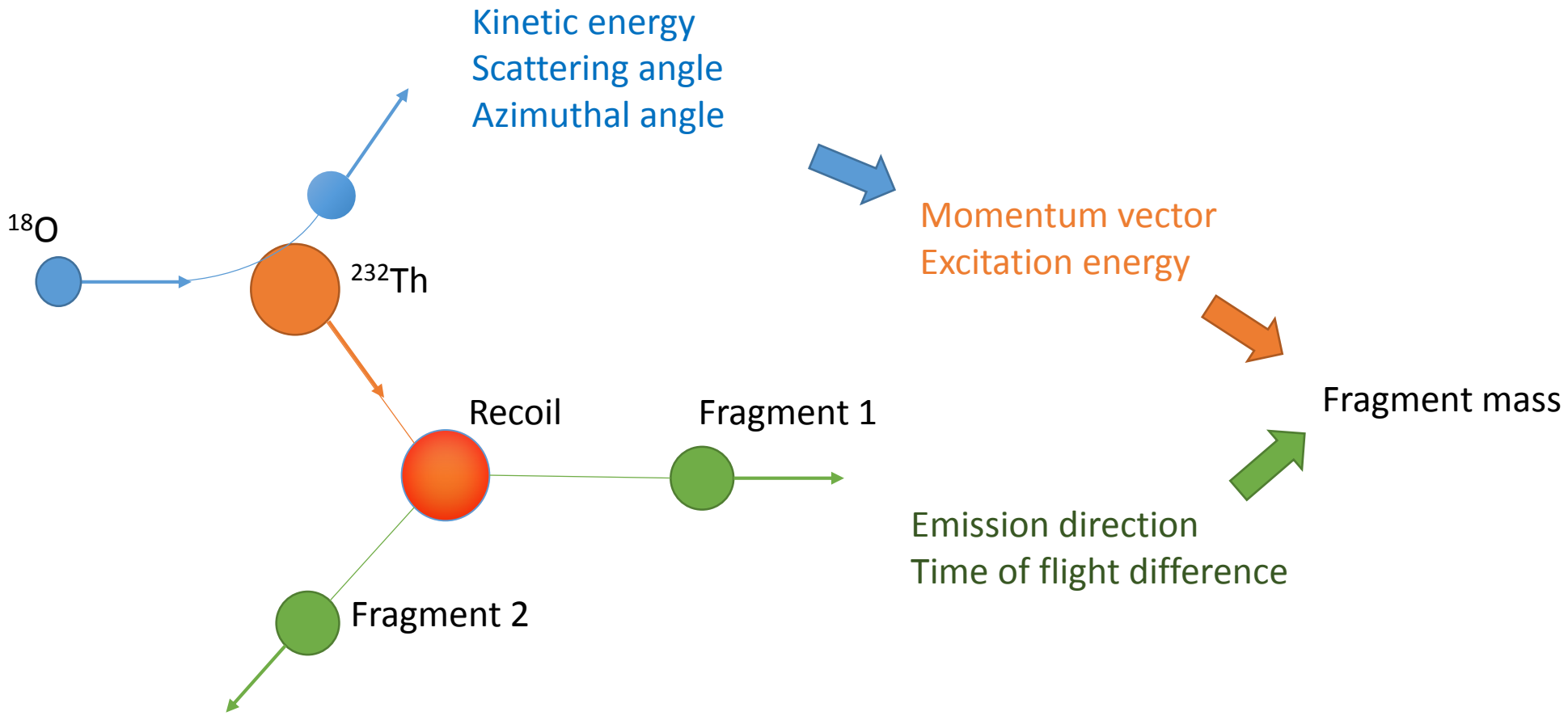
Experimental Setup to measure fragment mass





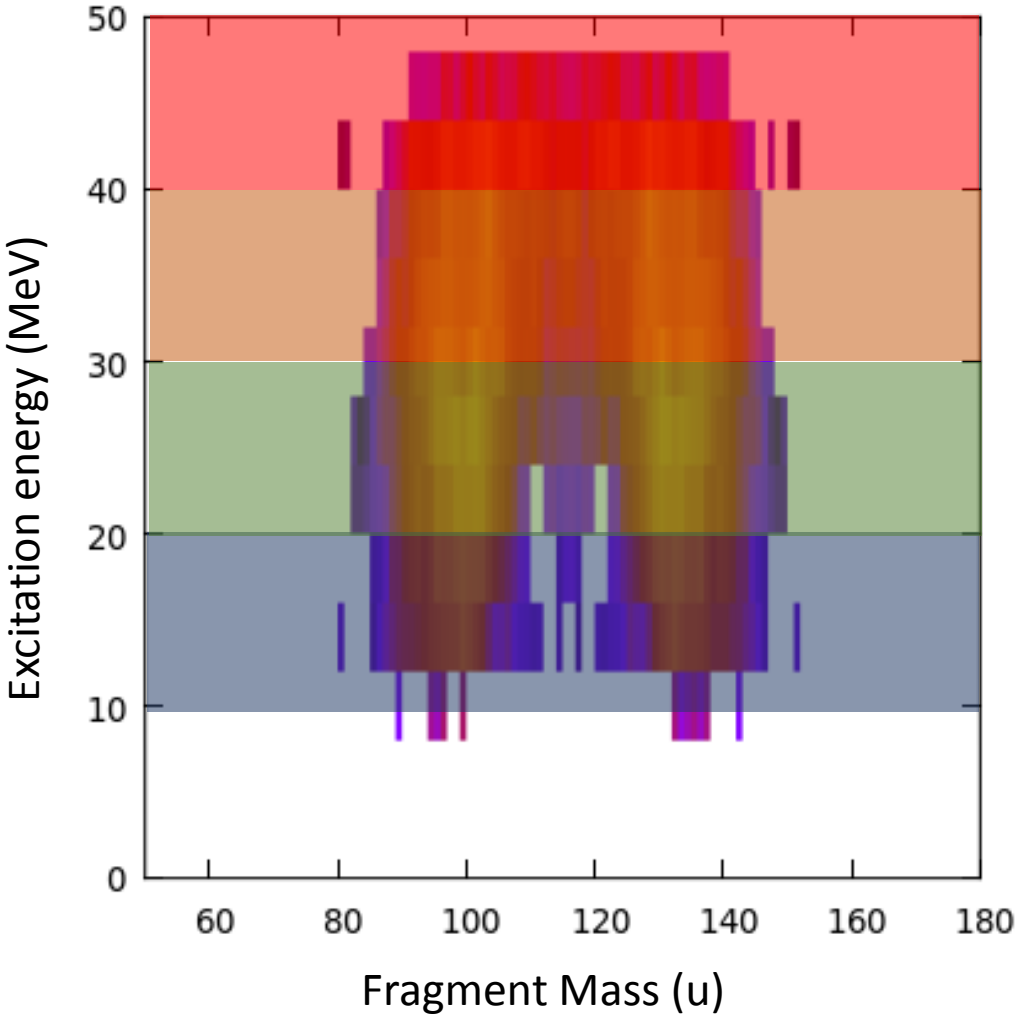


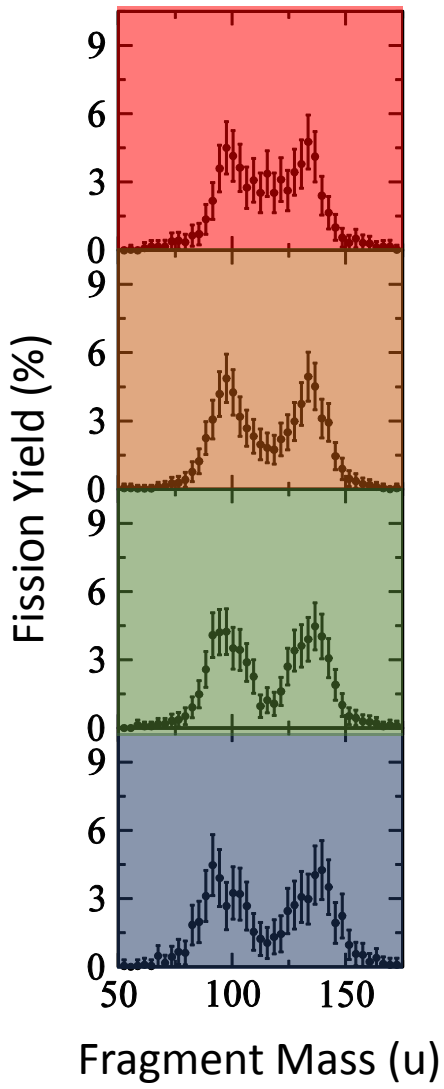
Event reconstruction



Excitation Energy vs Fragment Mass

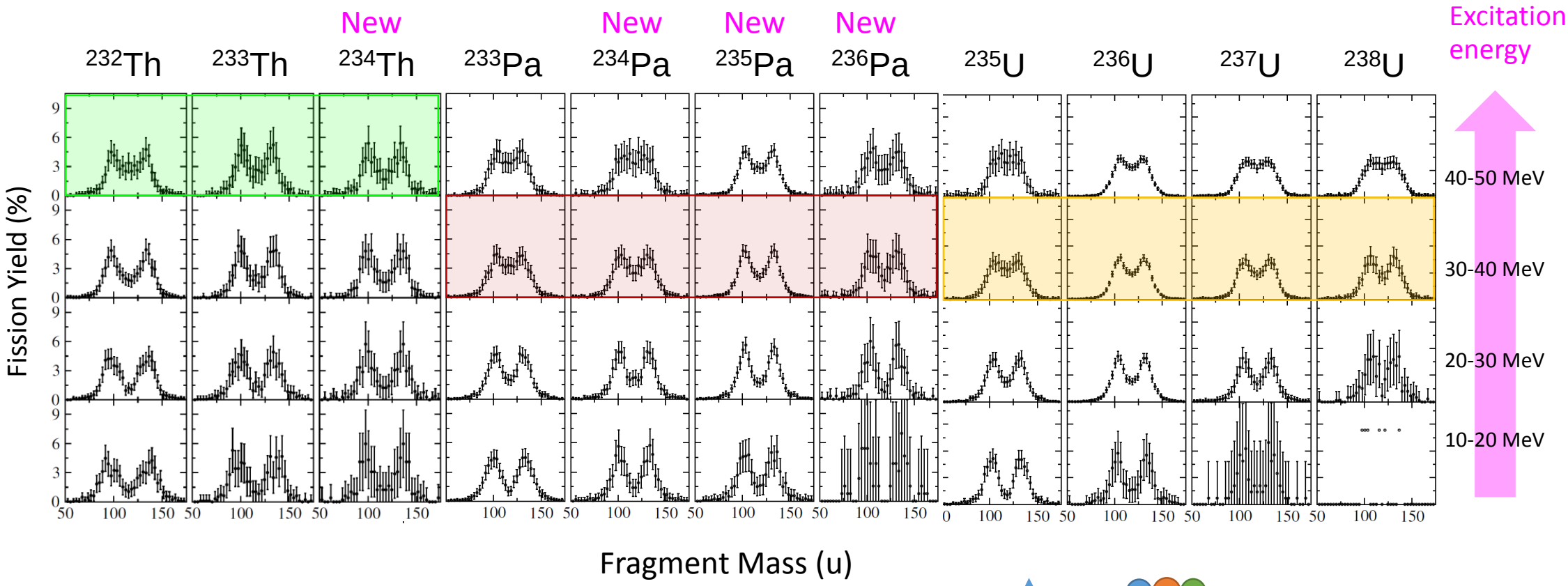
$^{232}Th(^{18}O,^{18}O)^{232}Th$

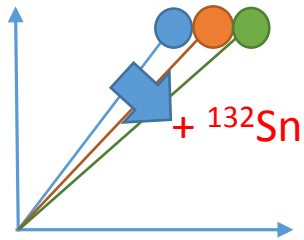




Excitation Energy vs Fragment Mass

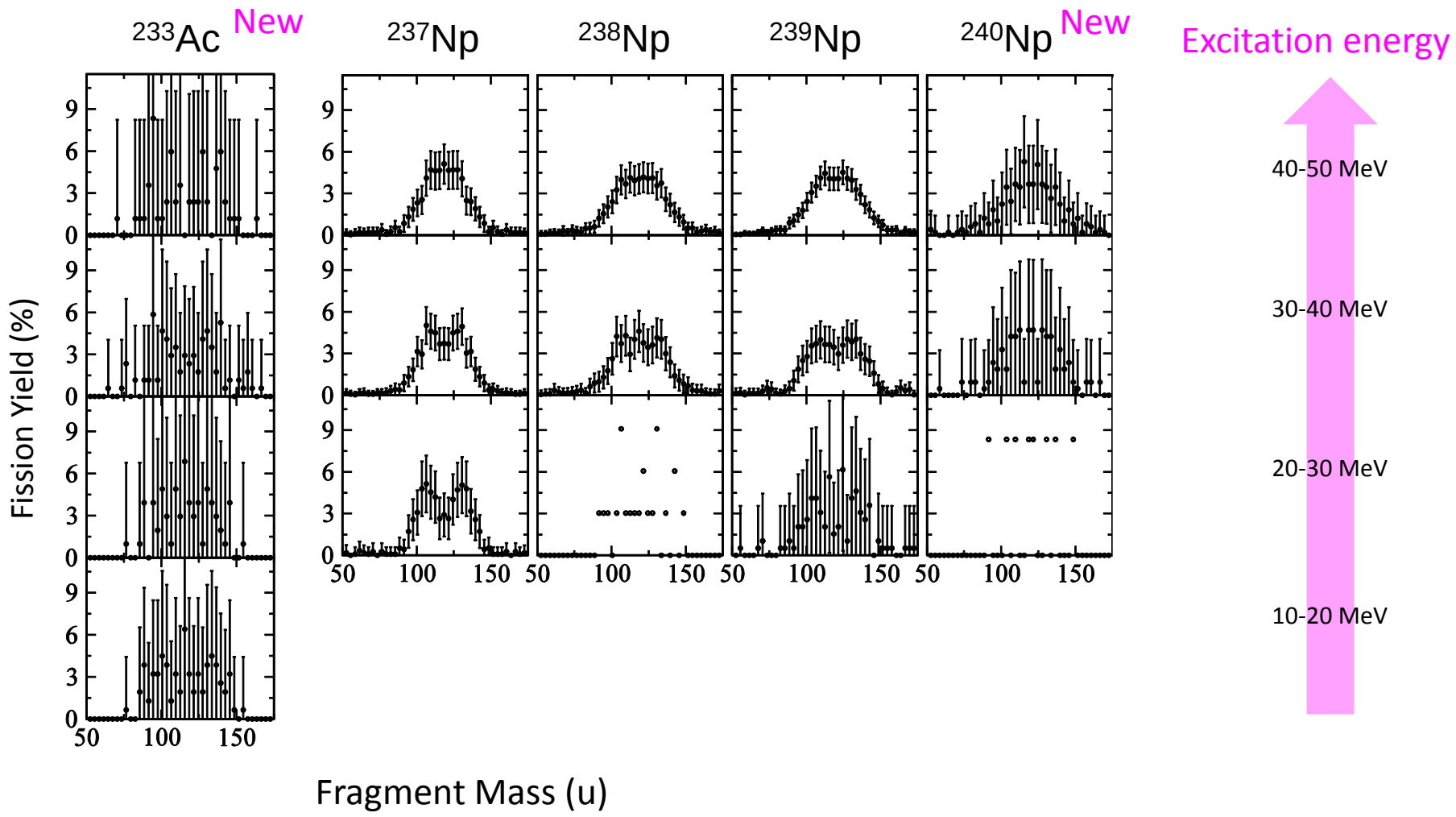
$^{18}O + ^{232}Th$ reaction





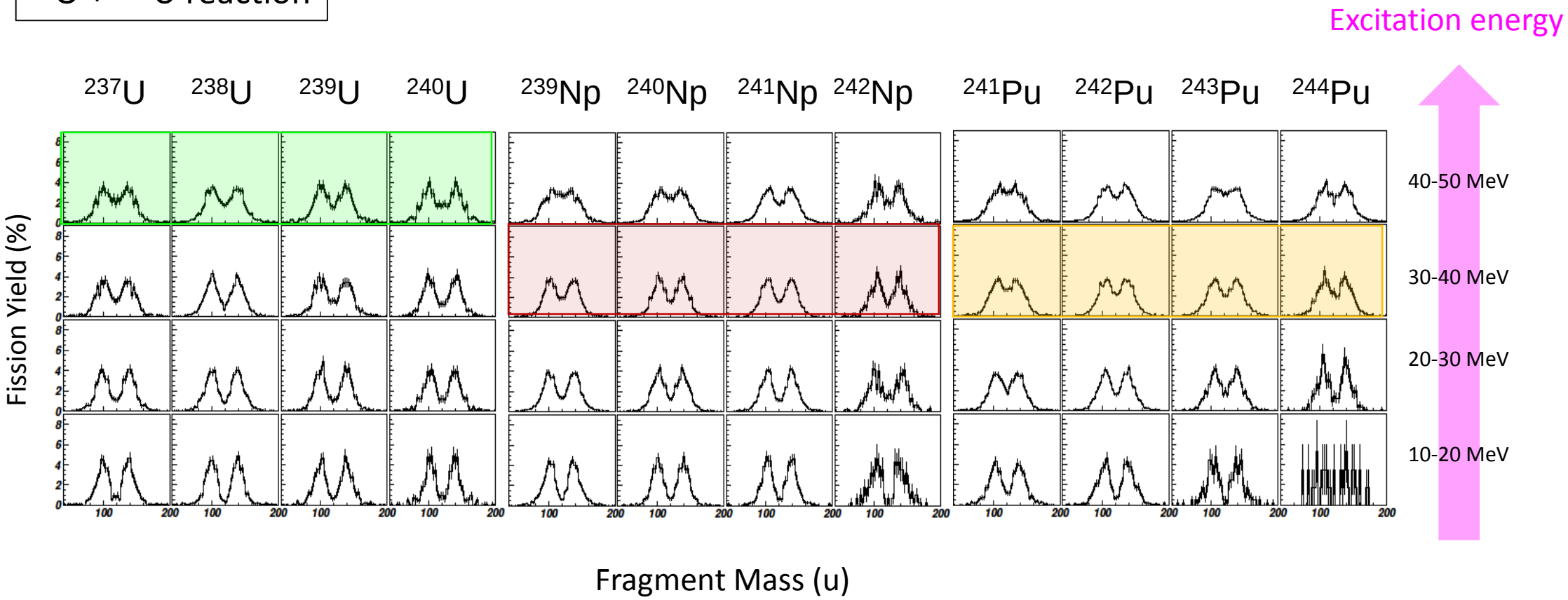
Excitation Energy vs Fragment Mass

$^{18}O + ^{232}Th$ reaction



Excitation Energy vs Fragment Mass

$^{18}O + ^{238}U$ reaction

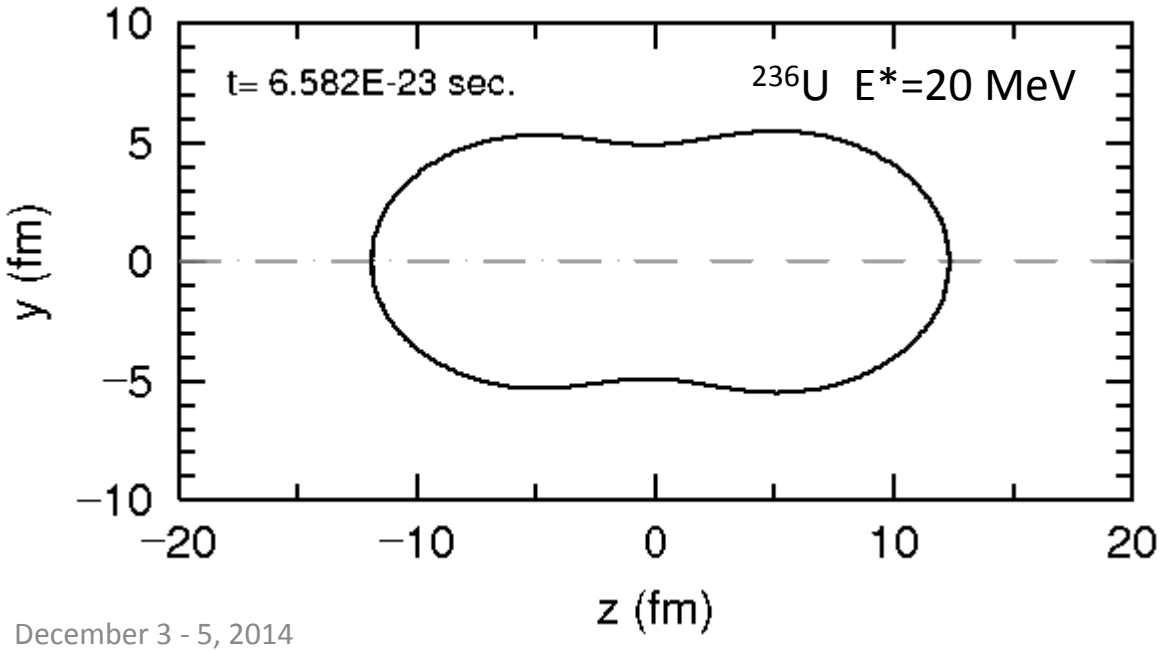


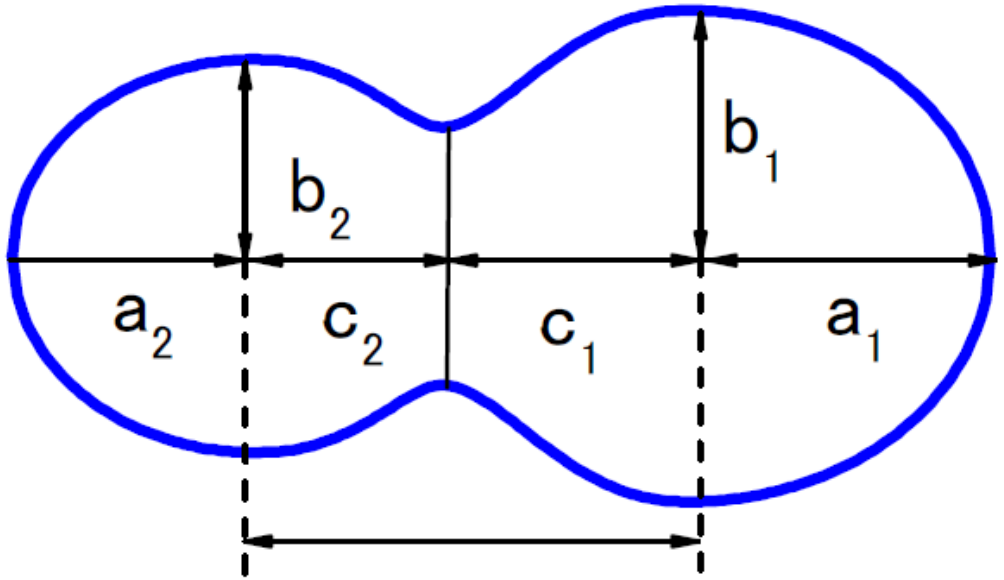
Nuclear Shape

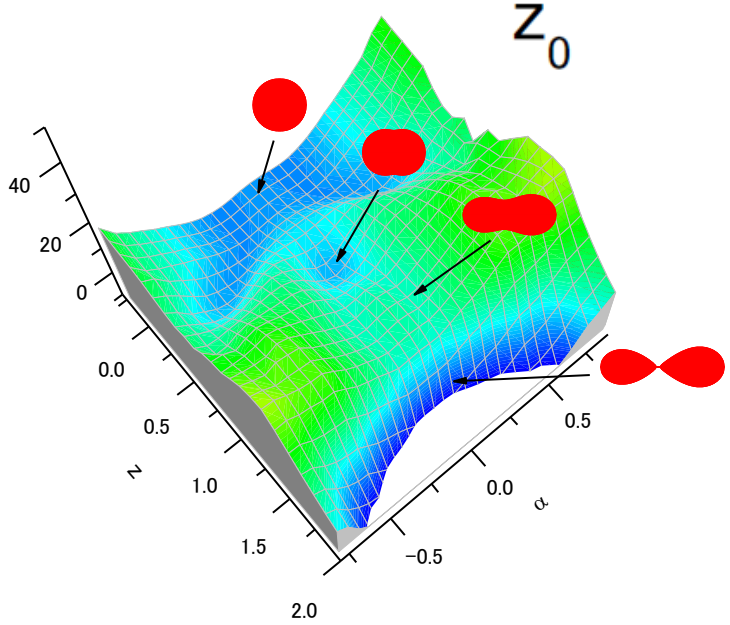
Potential energy calculation based on three shape parameters:

1. Charge center distance
2. Mass-asymmetry
3. Deformation.

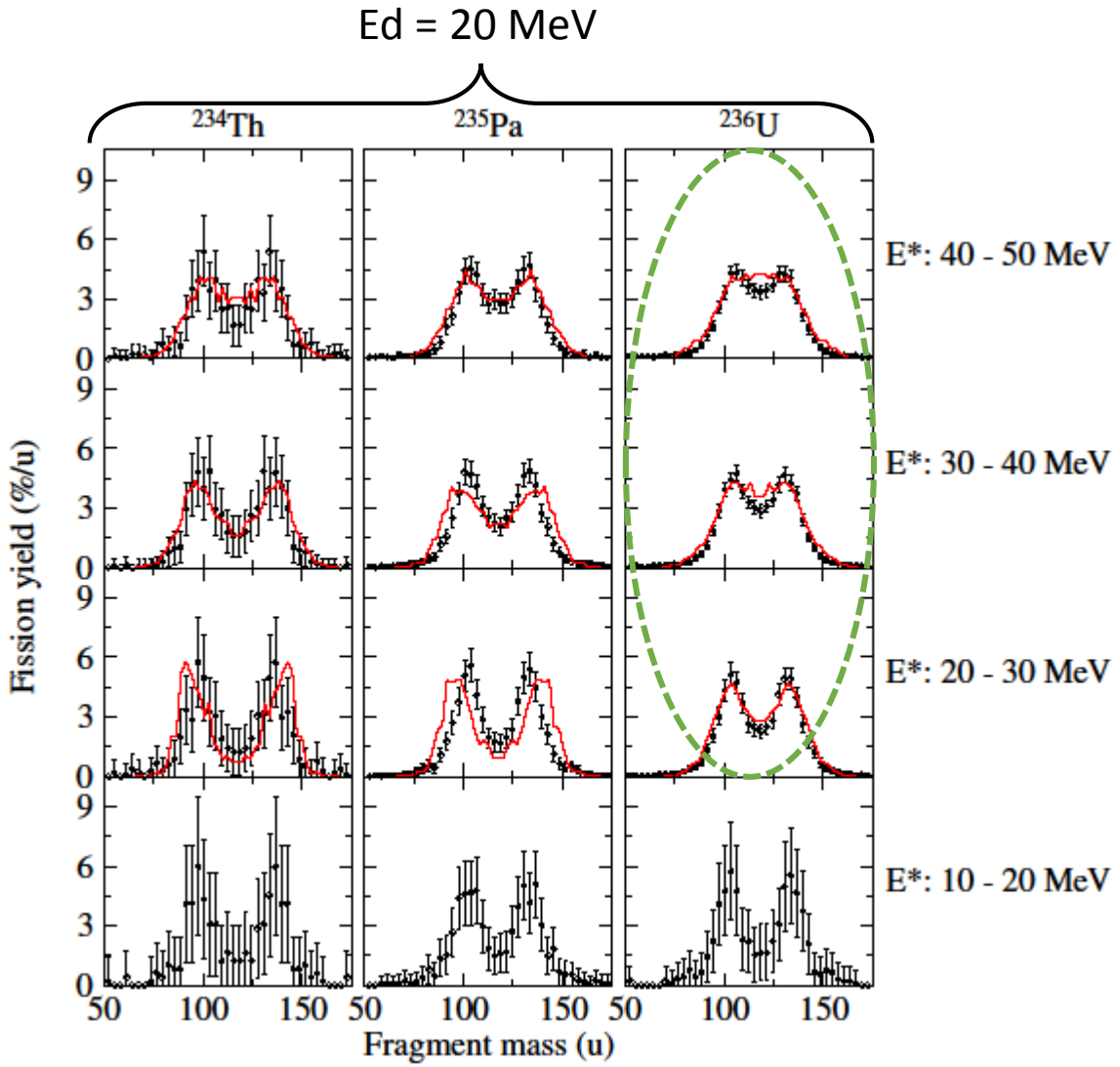
Then trajectory (shape evolution) was calculated time dependently by solving Langevin Equation



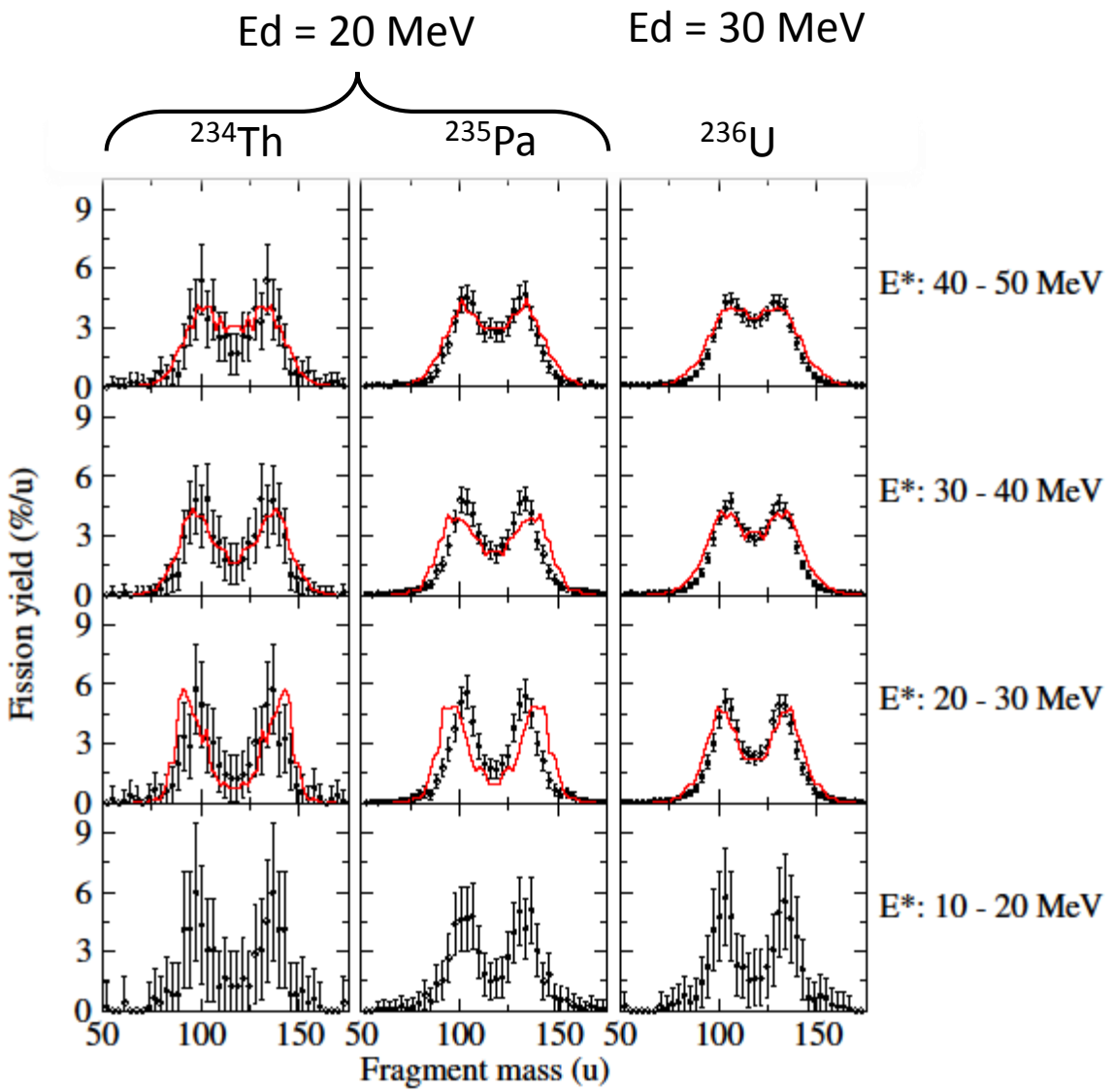




Excitation Energy vs Fragment Mass



Excitation Energy vs Fragment Mass



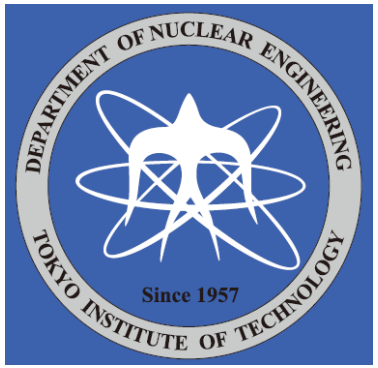
Summary

- Large set of fissioning nuclei that are under study
- Large range of excitation from few MeV up to ~ 50 MeV
- Evolution shell dumping energy in function of Z and N: ~ 30 MeV
- Prompt neutron analysis (on going)
- Anisotropy analysis (on going)

Collaborations

Kyoto University
Research Reactor Institute

interdisciplinary Graduate School
of Engineering Sciences IGSES Kyushu University



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K. Nishio, K. Hirose,R. Léguillon, K. Makii, I. Nishinaka, R. Orlandi, J. Smallcombe, S. Chiba, S. Araki, Y. Watanabe, R. Tatsuzawa, N. Takaki, A. Andreyev