

### In-beam fission study at ASRC, JAEA

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From the measurements of fission-fragment mass distributions for nuclides around  $A=258$  for spontaneous fission, a unique sharp change from asymmetric fission to symmetric fission mode was found by moving from  $^{256}\text{Fm}$  to  $^{258}\text{Fm}$  [1]. To understand such specific phenomenon will give a unique opportunity to study the fission mechanism. At the Tokai tandem accelerator facility of Japan Atomic Energy Agency, we have performed the  $^4\text{He}+^{254}\text{Es}$  experiment producing  $^{258}\text{Md}$  whose fission has not been observed ever. The mass-TKE correlation at 15, 16, 18 and 20-MeV excitation energies were obtained. Decomposition were performed by standard (asymmetric) mode, short and superlong (symmetric) modes and their excitation energy dependence will be discussed.

Another topic is the angular momentum transfer in the multi-nucleon transfer (MNT) reaction. MNT are expected one of viable reactions to produce super-heavy nuclei with more neutrons [2]. The angular momentum is an important property of a compound nucleus which has an effect on its survival probability. In MNT reactions, the axis of the angular-momentum transfer can be identified to be perpendicular to the reaction plane. Thus, the fission-fragment angular distribution measured with respect to this axis is strongly reflected by the angular momentum. We performed the fission-fragment angular distribution measurements in the  $^{18}\text{O}+^{237}\text{Np}$  reaction, and the results for produced compound nuclei of  $^{236-240}\text{Np}$ ,  $^{237-242}\text{Pu}$ ,  $^{238-245}\text{Am}$ ,  $^{243-245}\text{Cm}$  will be presented.

### References

- [1] D.C. Hoffman et al., *Radiochimica Acta* 70/71, 135 (1995).
- [2] V.I. Zagrebaev and W. Greiner, *Phys. Rev. C* 87, 034608 (2013).