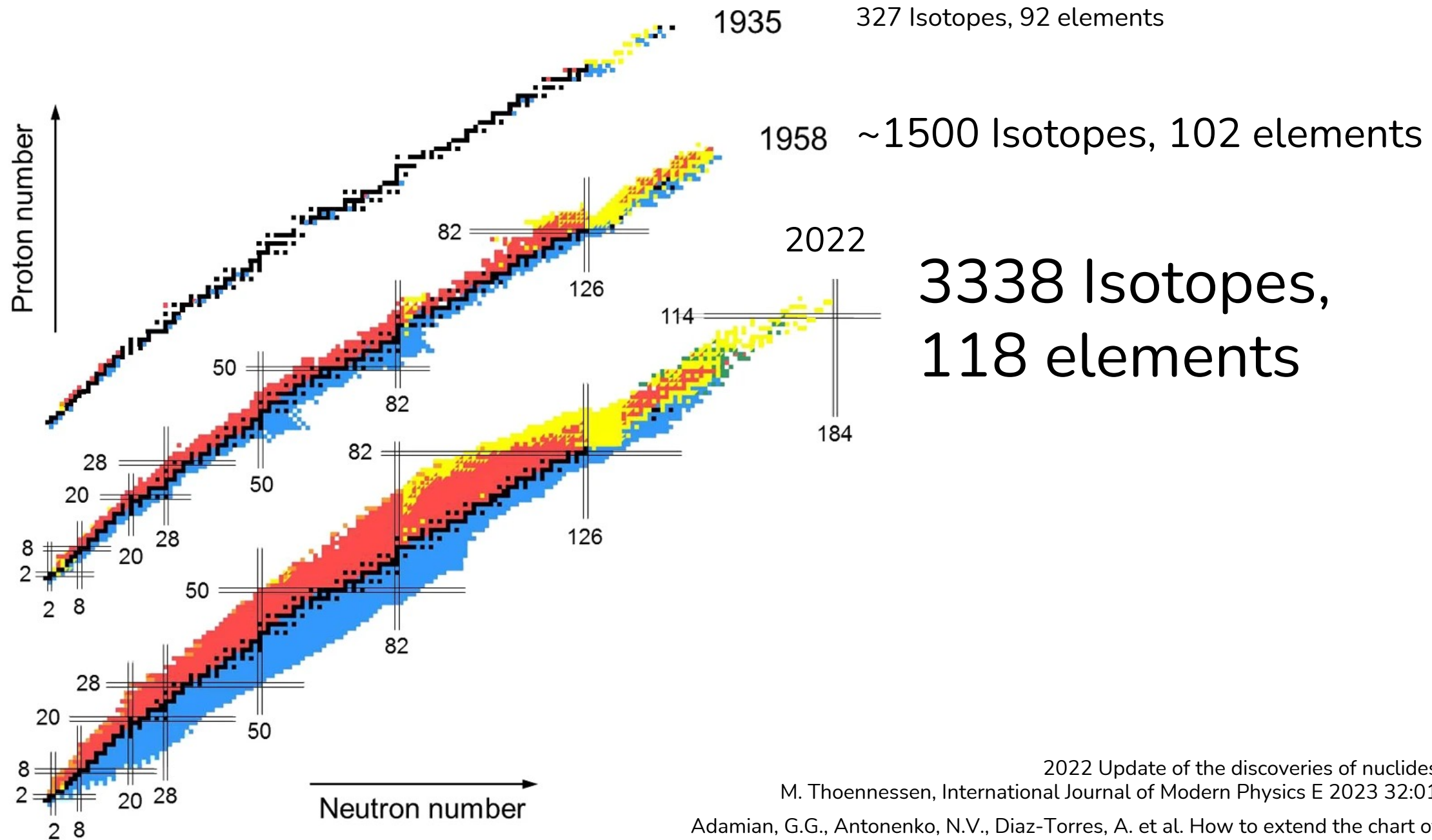




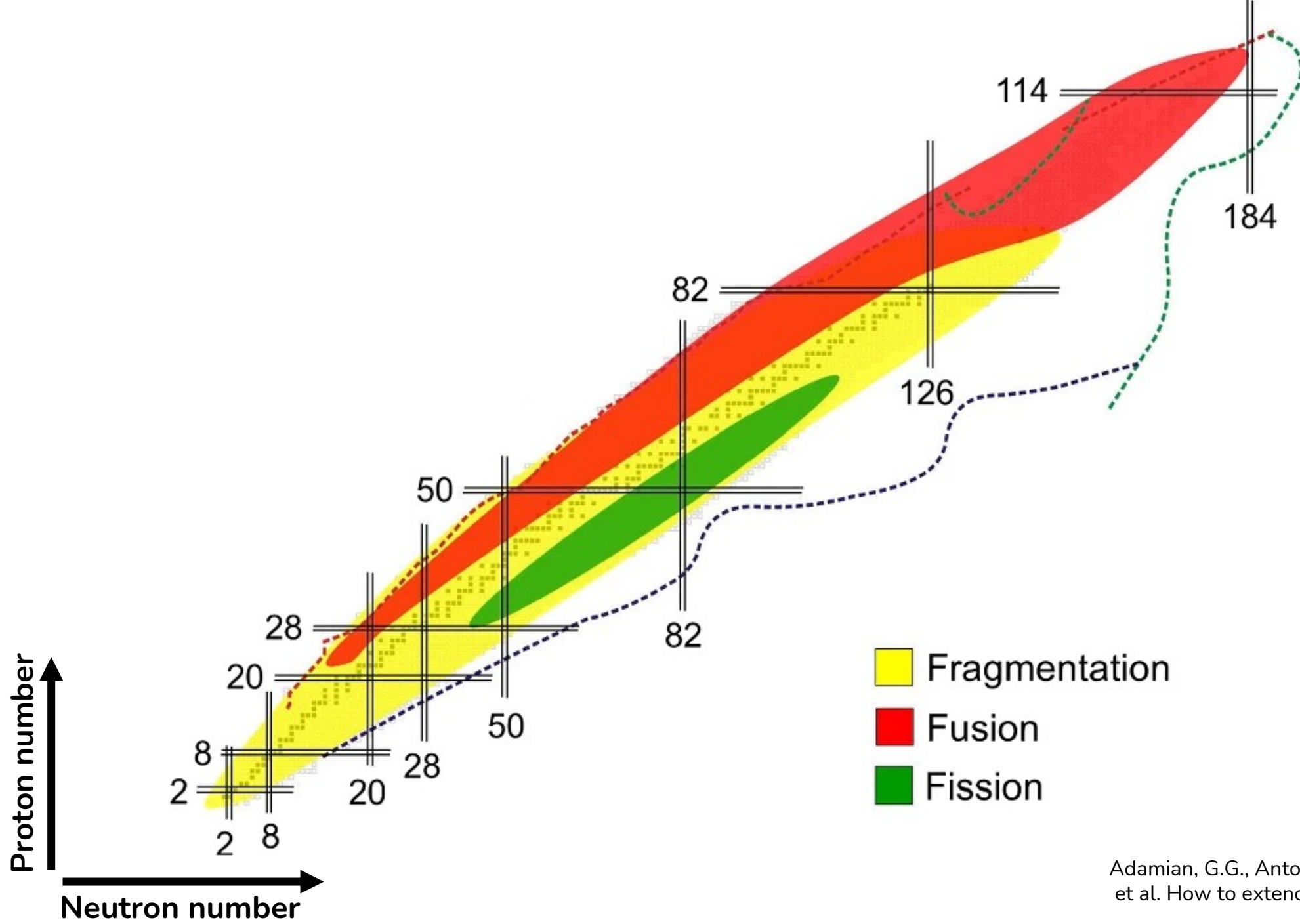
university of
 groningen

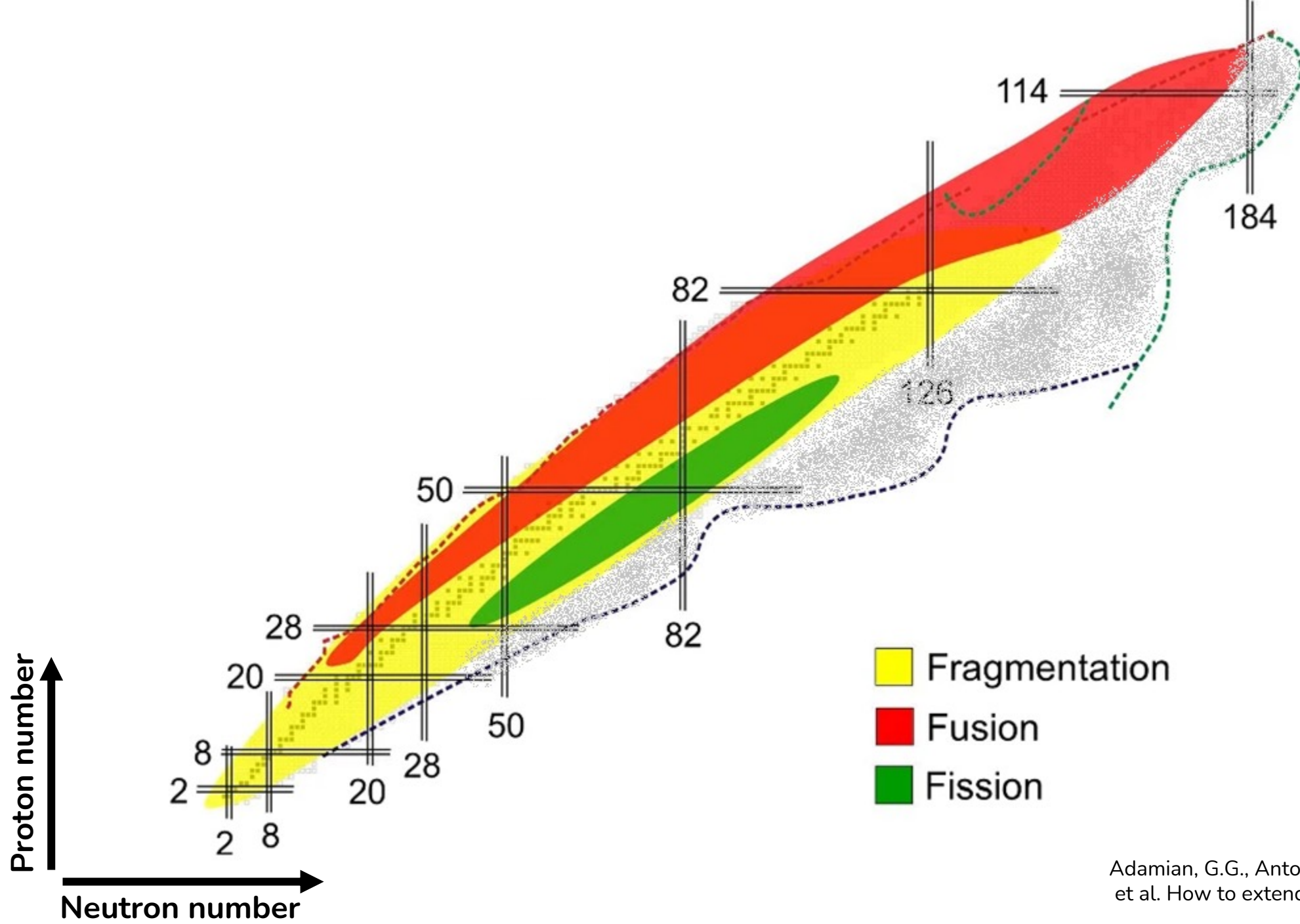
Exploring the reaction $^{64}\text{Ni} + ^{238}\text{U}$ at RITU

Jennifer B. Cipagauta Mora



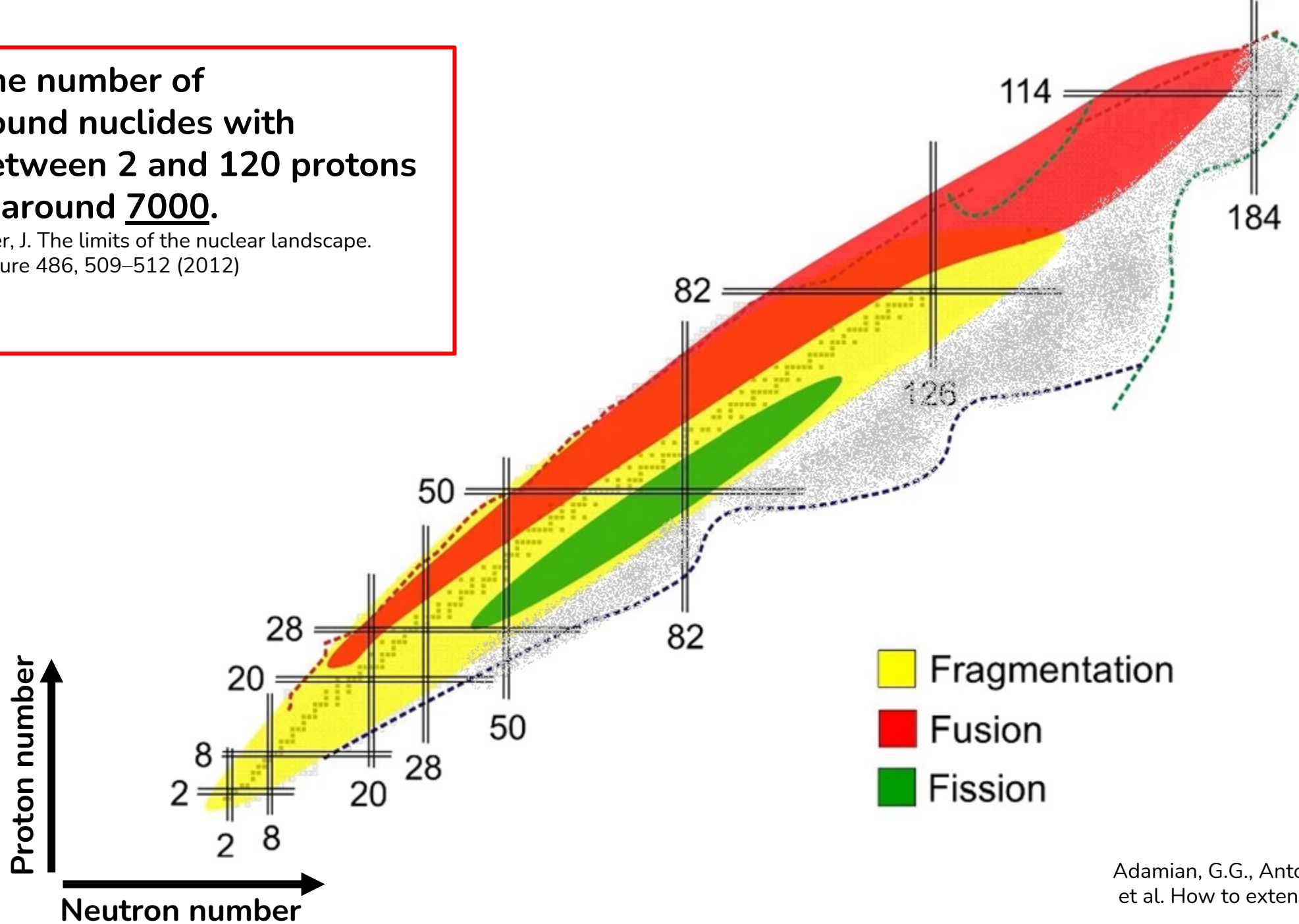
2022 Update of the discoveries of nuclides
 M. Thoennessen, International Journal of Modern Physics E 2023 32:01
 Adamian, G.G., Antonenko, N.V., Diaz-Torres, A. et al. How to extend the chart of
 nuclides?. Eur. Phys. J. A 56, 47 (2020)



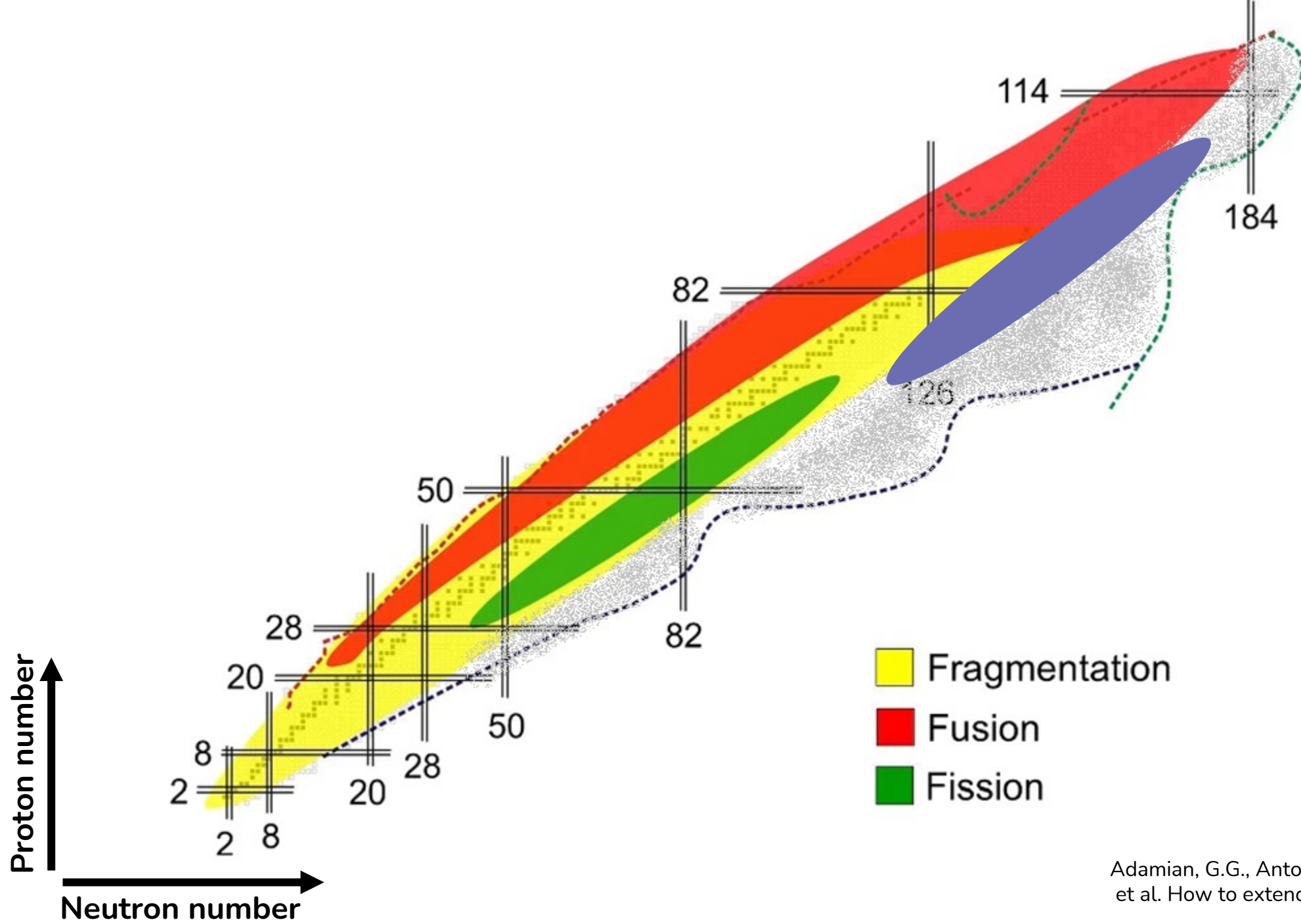


The number of bound nuclides with between 2 and 120 protons is around 7000.

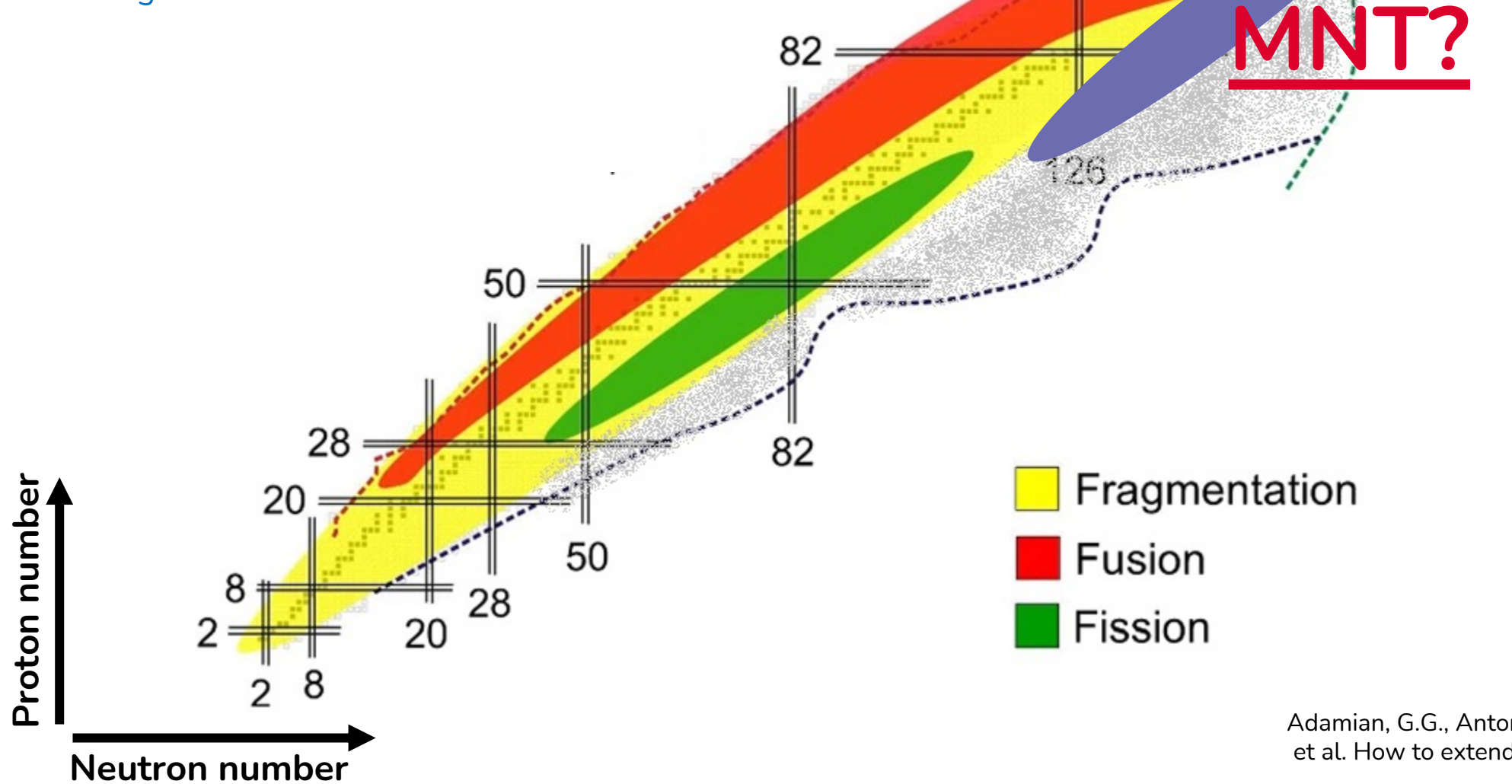
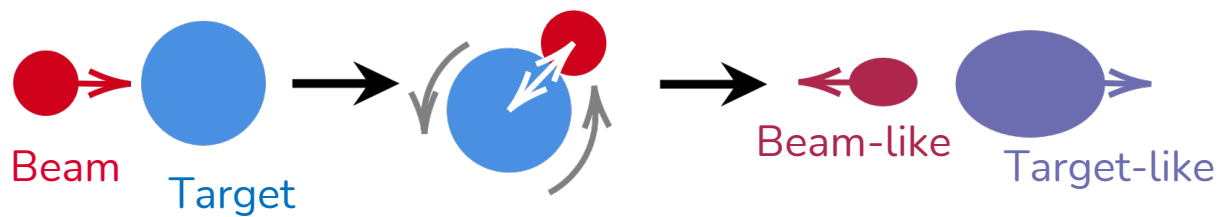
Erlor, J. The limits of the nuclear landscape. Nature 486, 509–512 (2012)



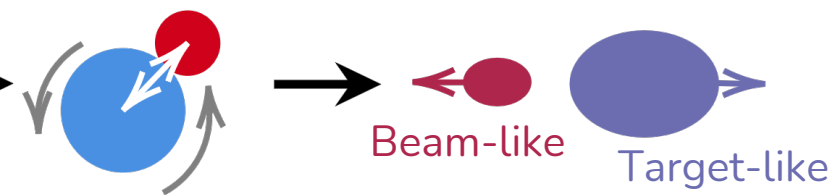
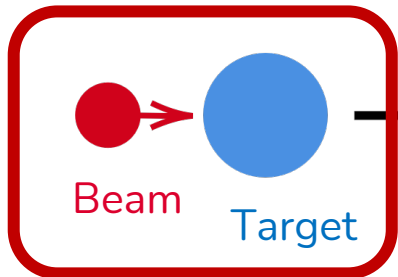
Adamian, G.G., Antonenko, N.V., Diaz-Torres, A. et al. How to extend the chart of nuclides?. Eur. Phys. J. A 56, 47 (2020)



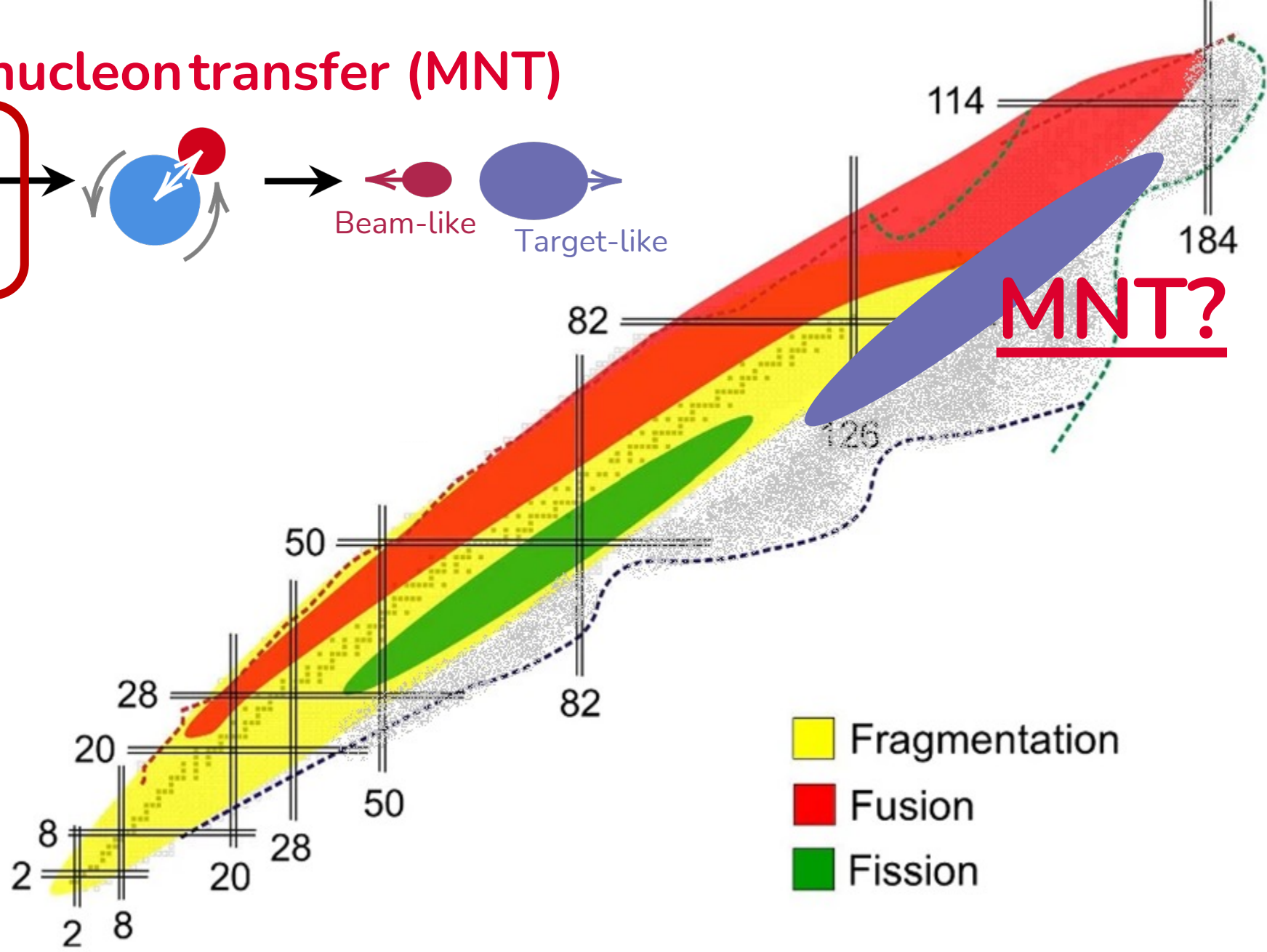
Multinucleon transfer (MNT)



Multinucleon transfer (MNT)

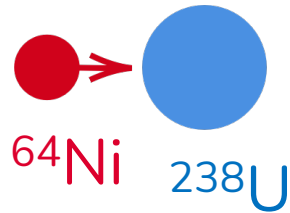


Proton number
Neutron number



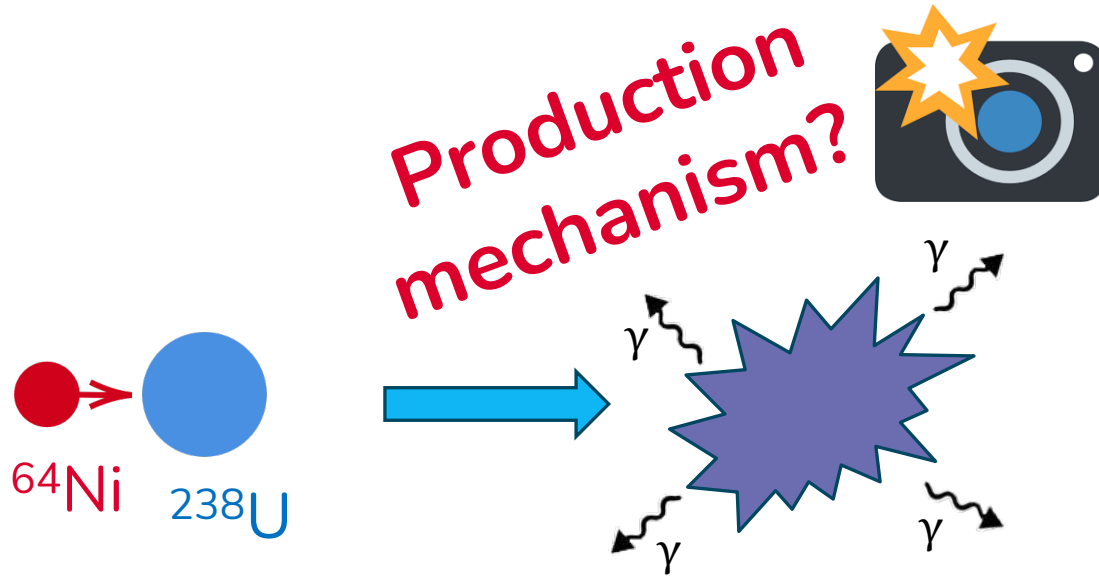
- Fragmentation
- Fusion
- Fission

The experiment



@ 0.97, 1 and 1.03 Coulomb barrier
($E_{\text{lab}} = 333 \text{ MeV}$)

The experiment



@ 0.97, 1 and 1.03 Coulomb barrier
($E_{\text{lab}} = 333 \text{ MeV}$)

The experiment

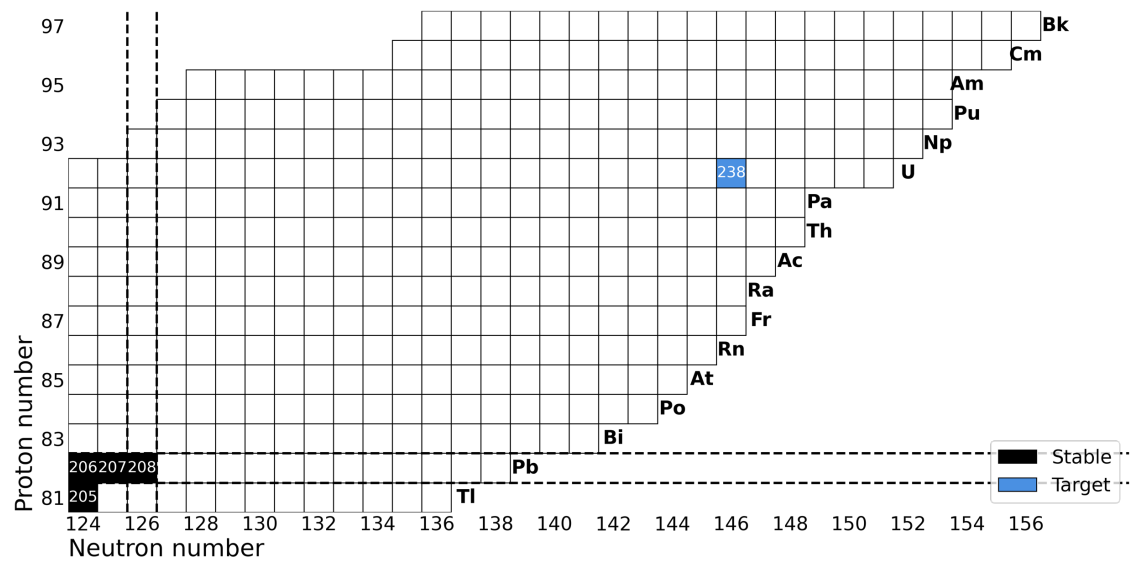


@ 0.97, 1 and 1.03 Coulomb barrier
($E_{\text{lab}} = 333 \text{ MeV}$)

The experiment



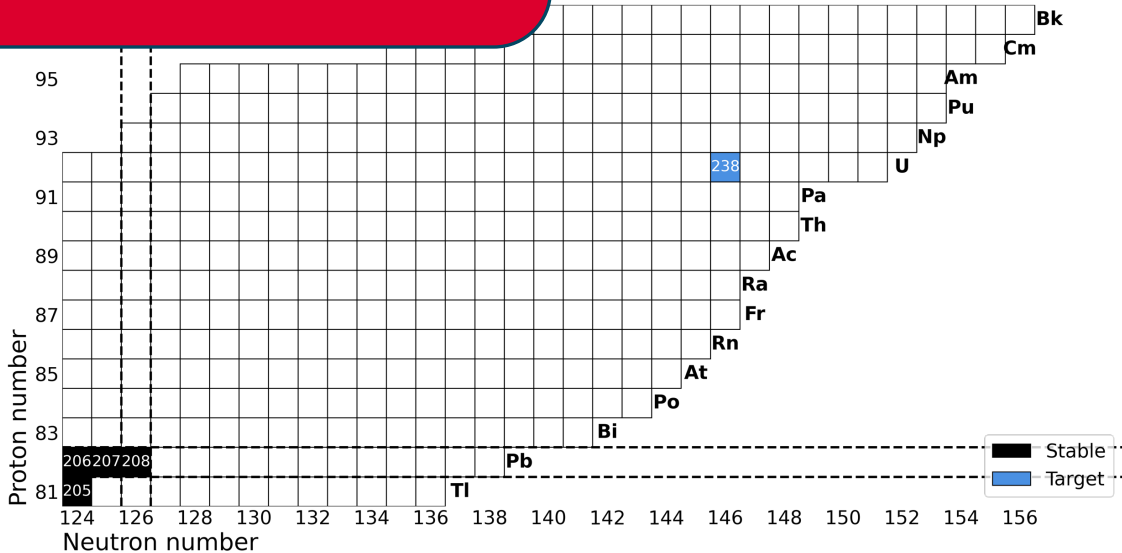
@ 0.97, 1 and 1.03 Coulomb barrier
 ($E_{\text{lab}} = 333 \text{ MeV}$)



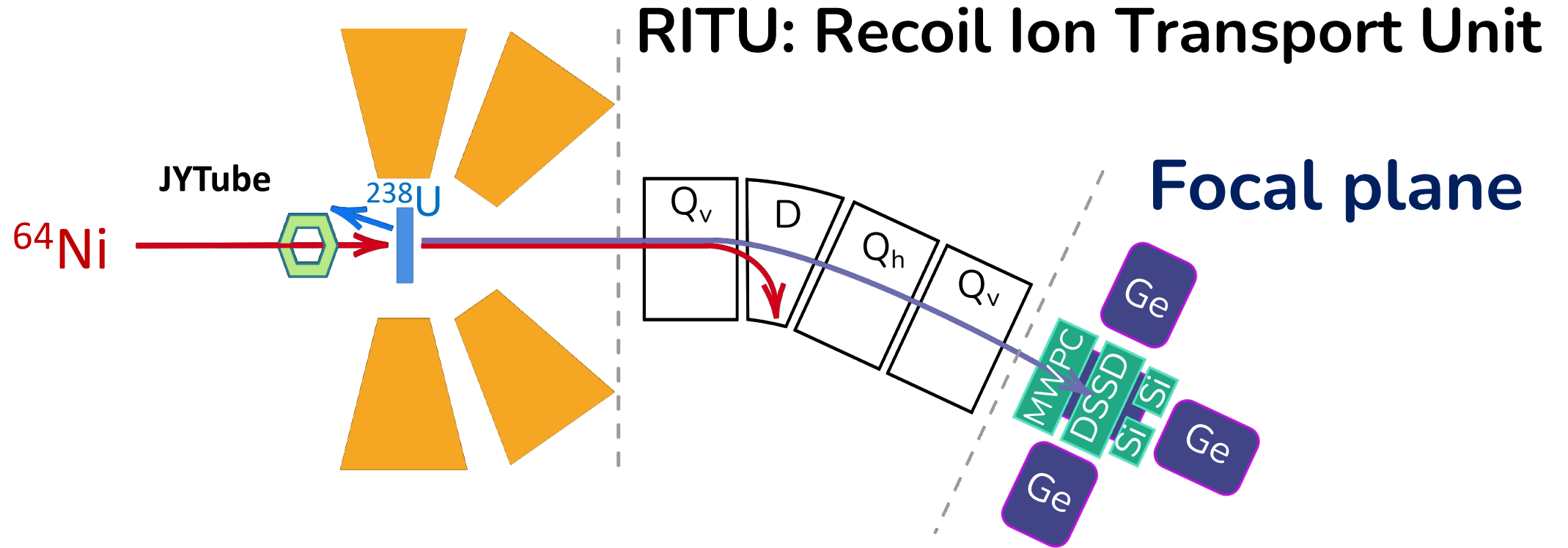
The experiment



@ 0.97, 1 and 1.03 Coulomb barrier
 ($E_{\text{lab}} = 333 \text{ MeV}$)



JUROGAM



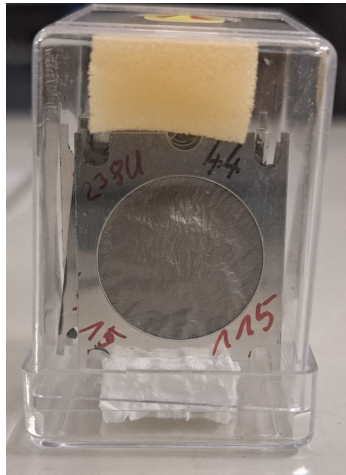
RITU: Recoil Ion Transport Unit

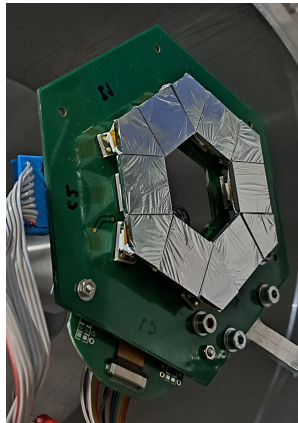
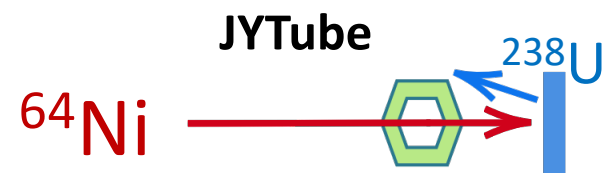
Focal plane

@ 0.97, 1 and 1.03 Coulomb barrier
($E_{\text{lab}} = 333 \text{ MeV}$)

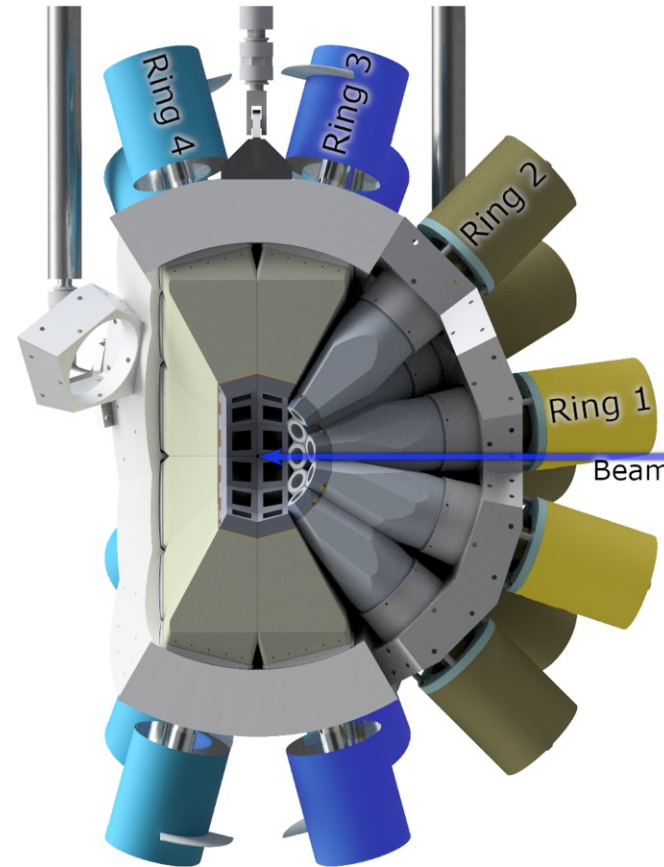
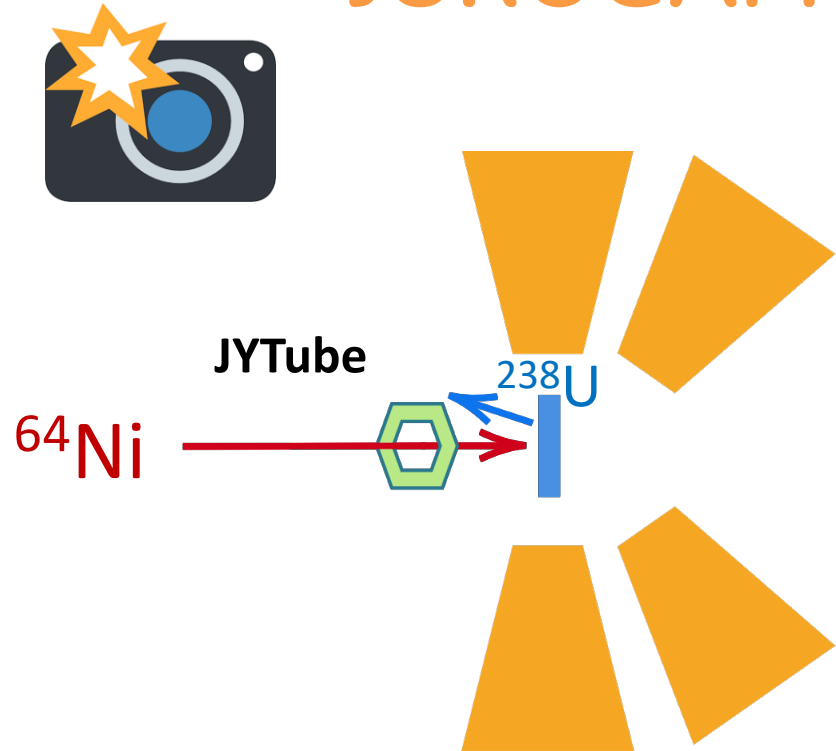


Beam intensities
from 2 pA to 16 pA

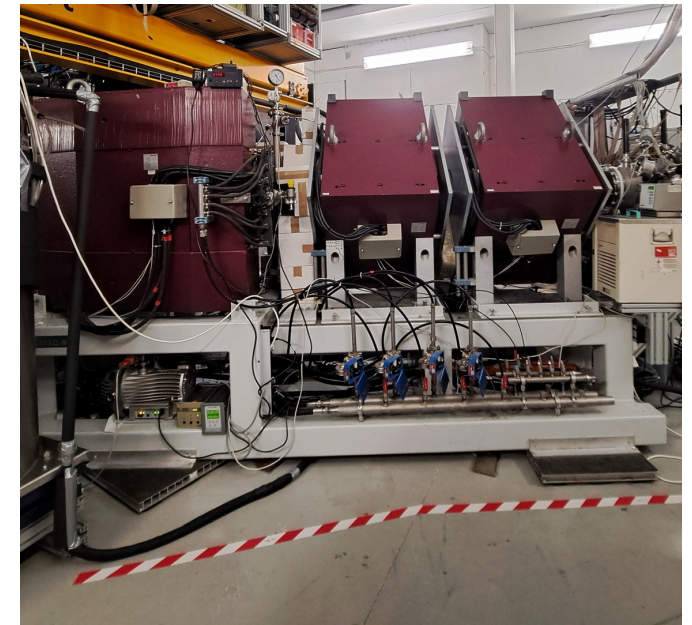
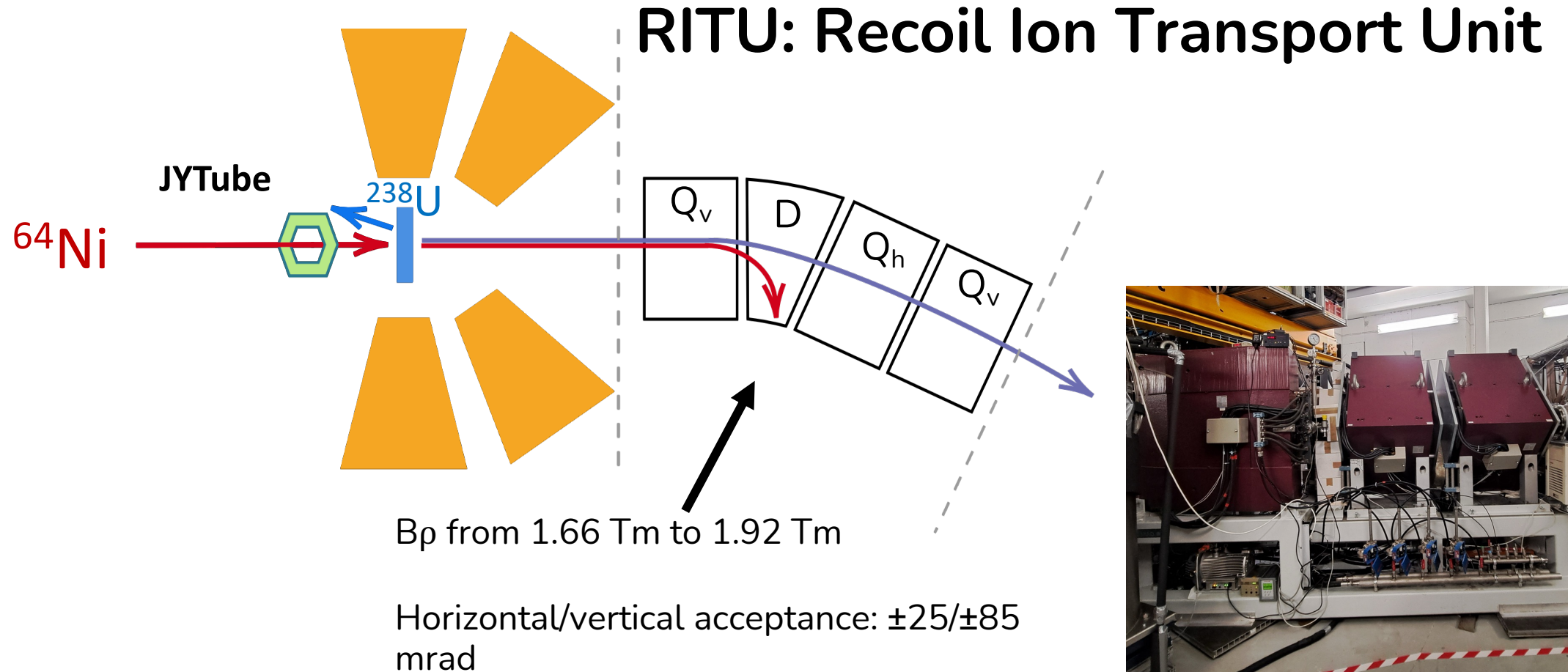




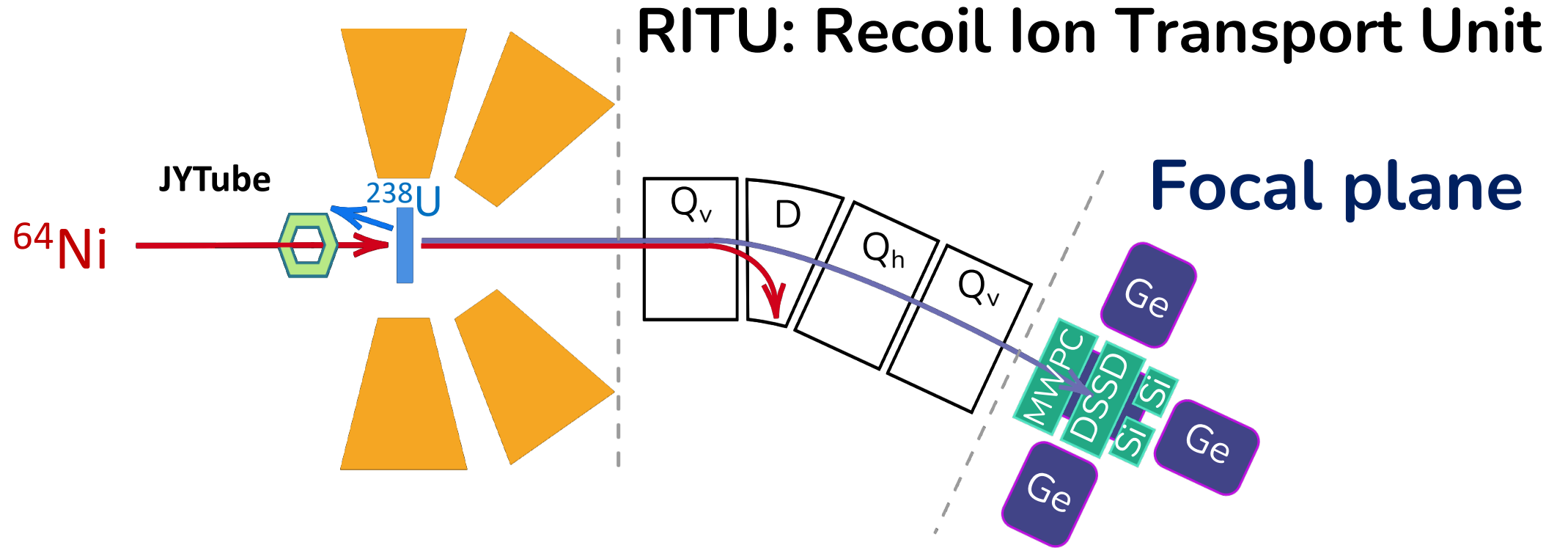
JUROGAM



JUROGAM

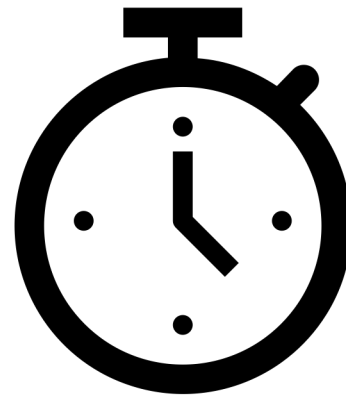
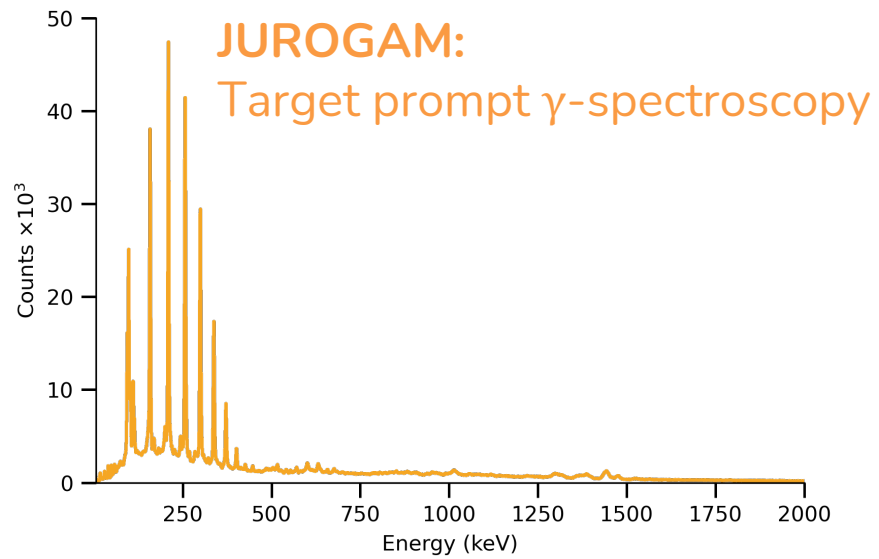


JUROGAM



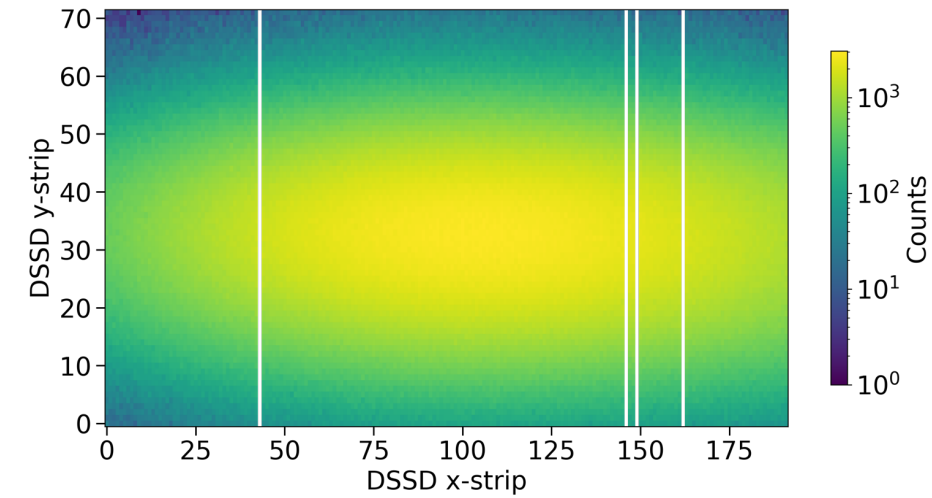
RITU: Recoil Ion Transport Unit

Focal plane

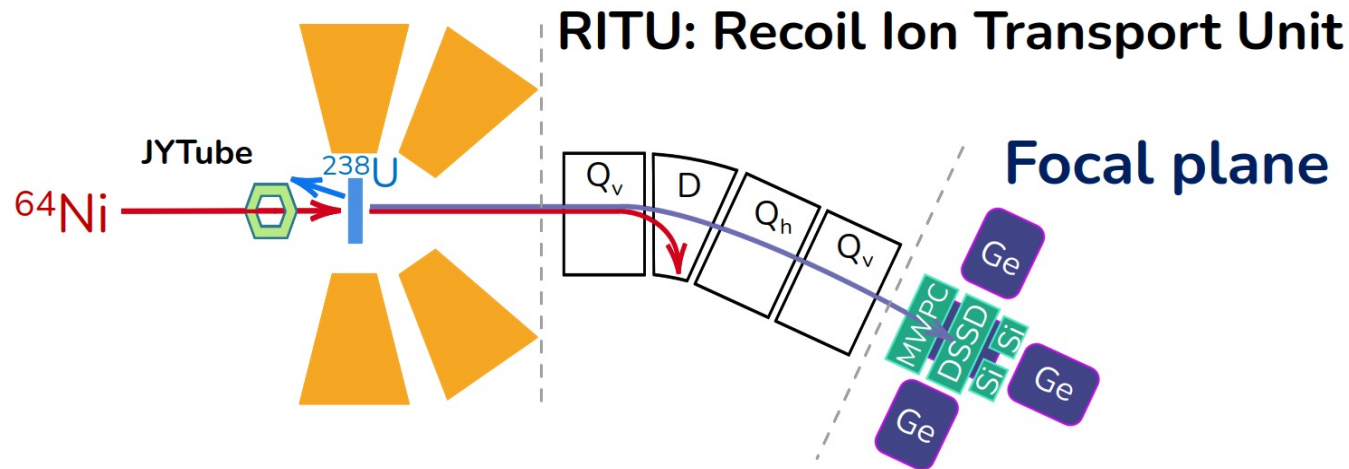


100 MHz clock

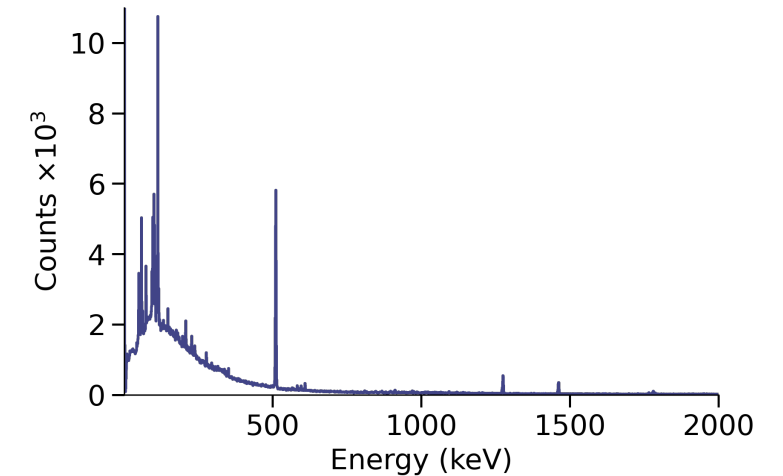
DSSD: Recoil implantation + decay (α, β, ce)



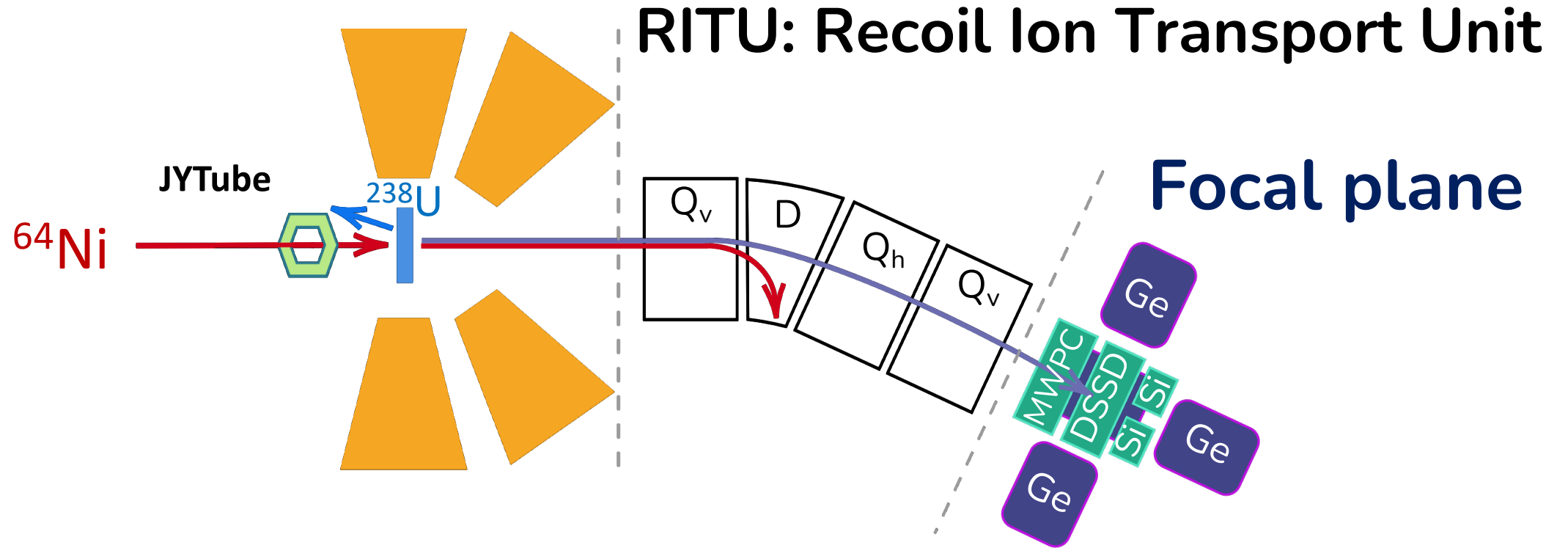
JUROGAM



FPGe: Delayed γ -spectroscopy



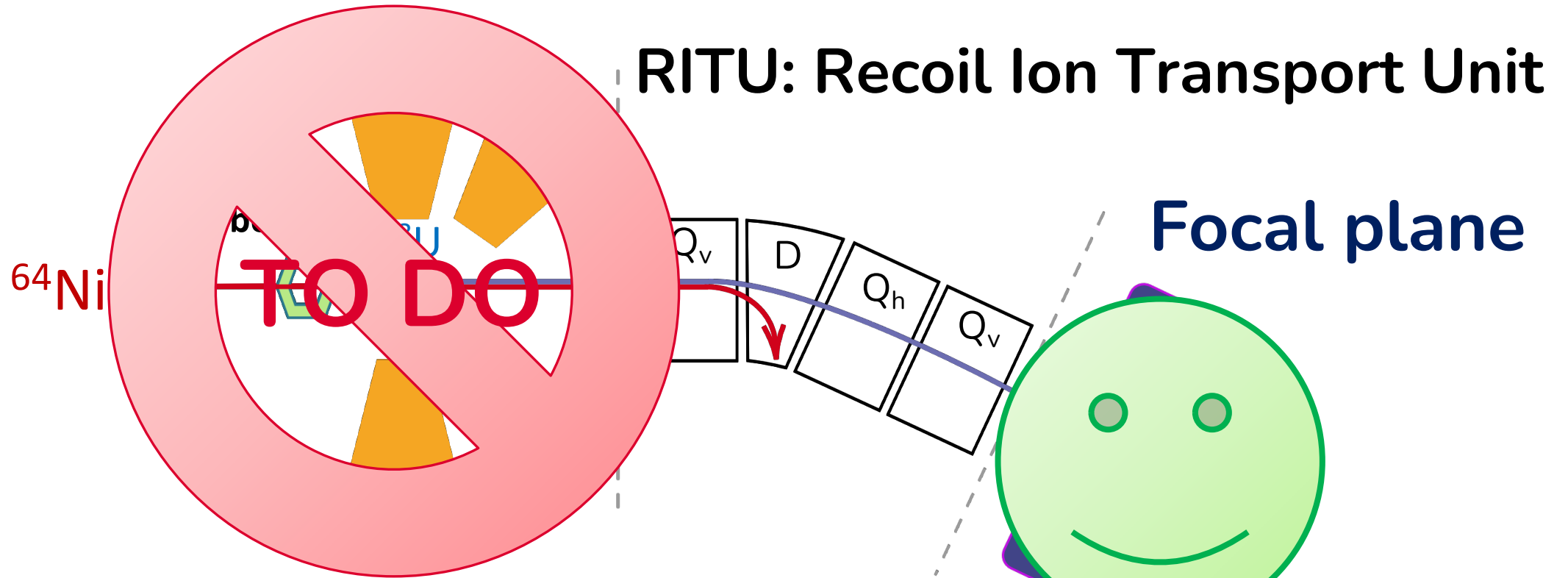
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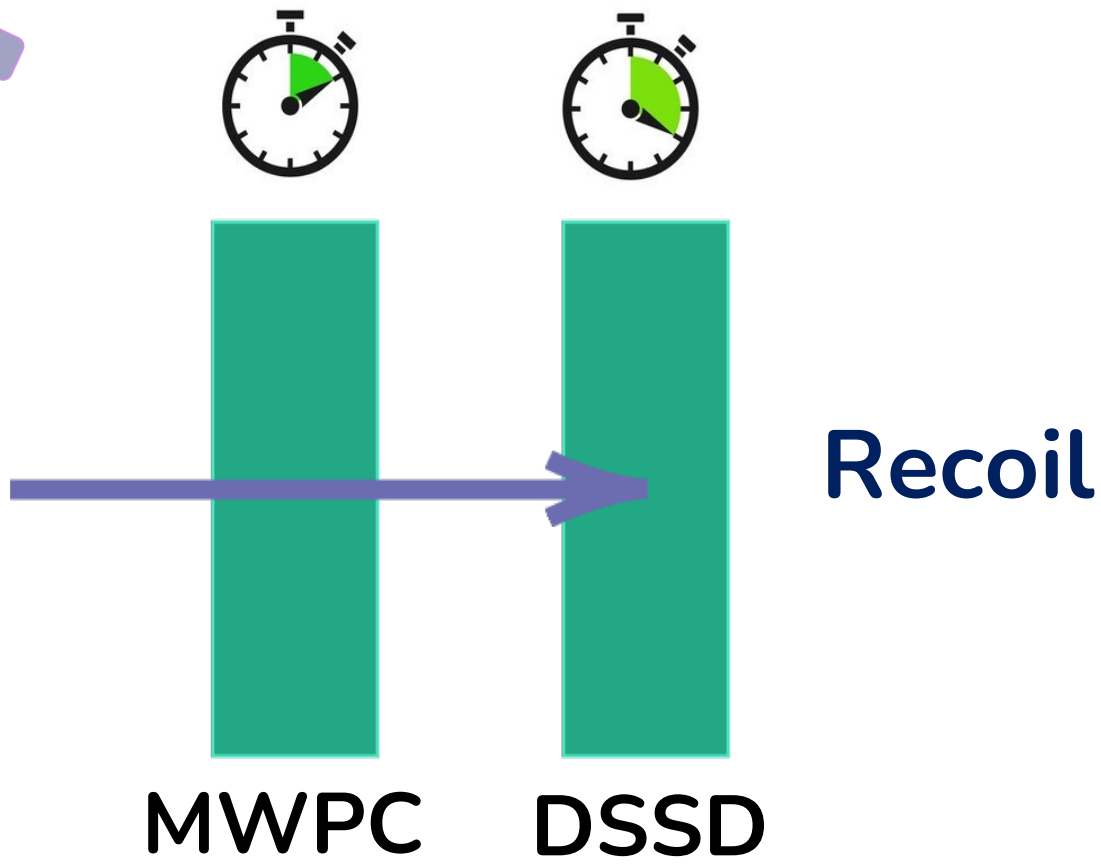
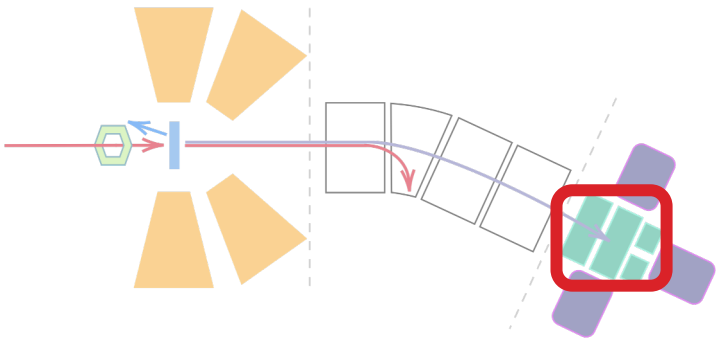
RITU: Recoil Ion Transport Unit

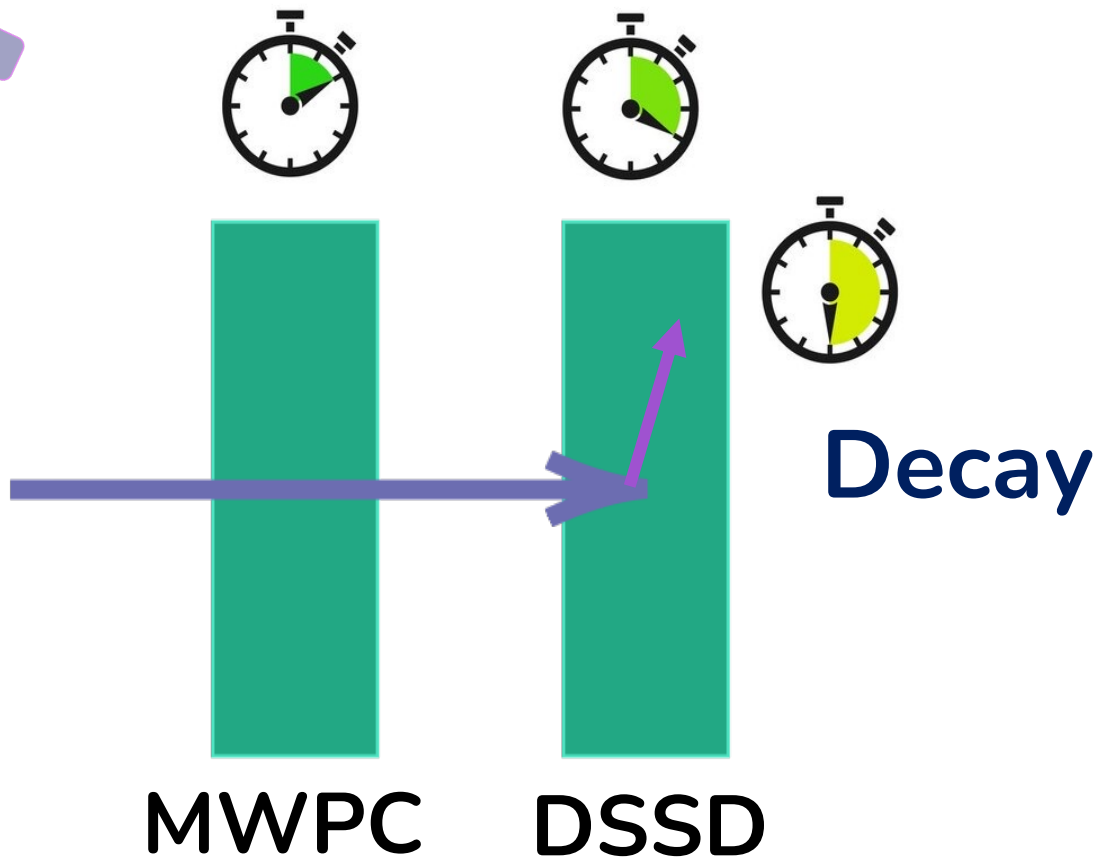
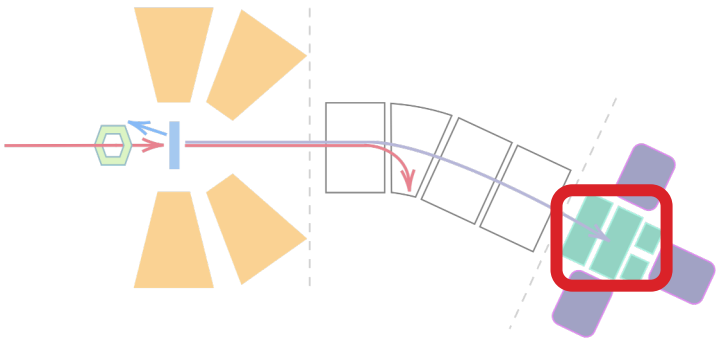
Focal plane

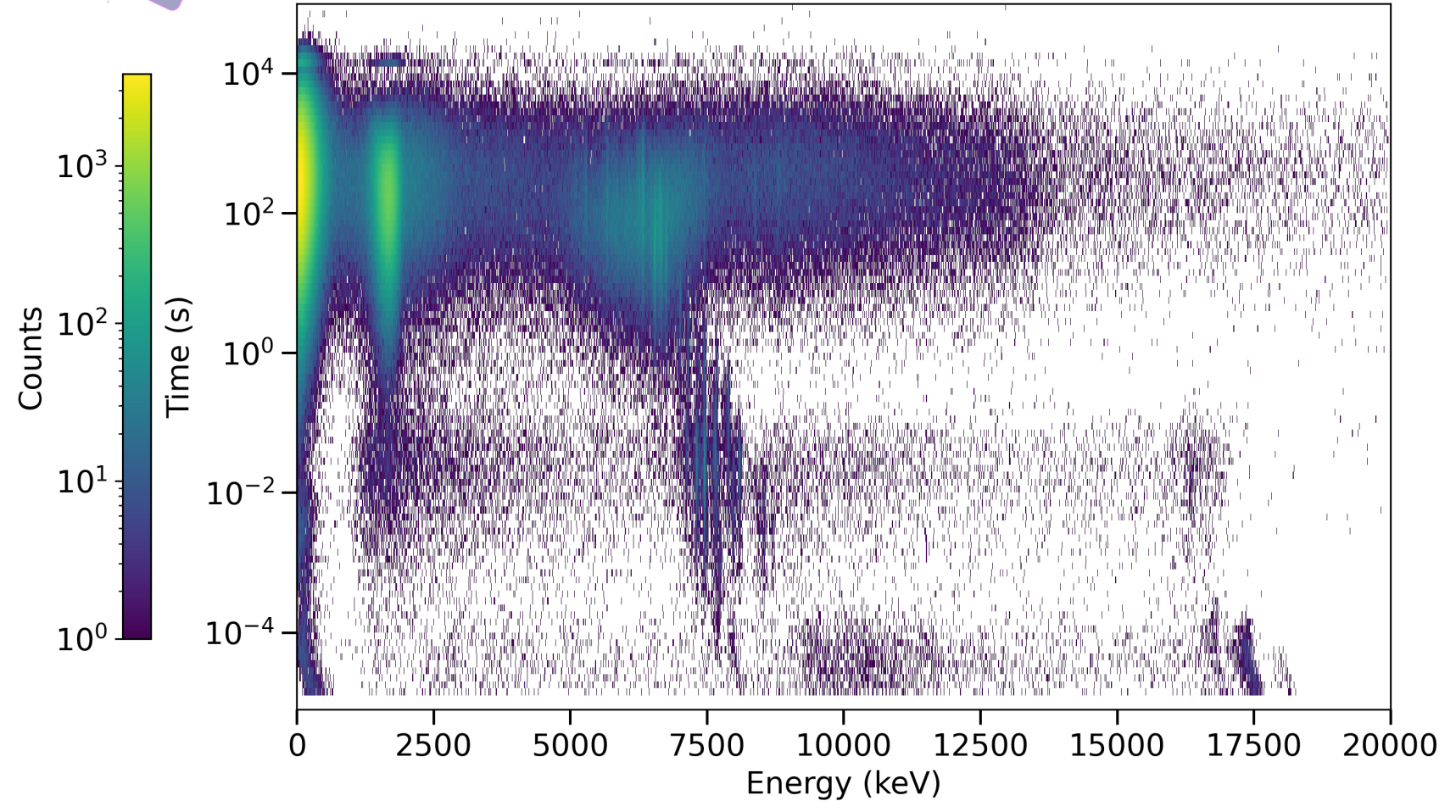
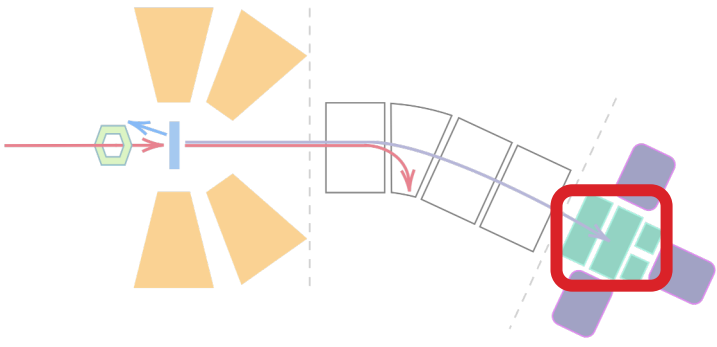
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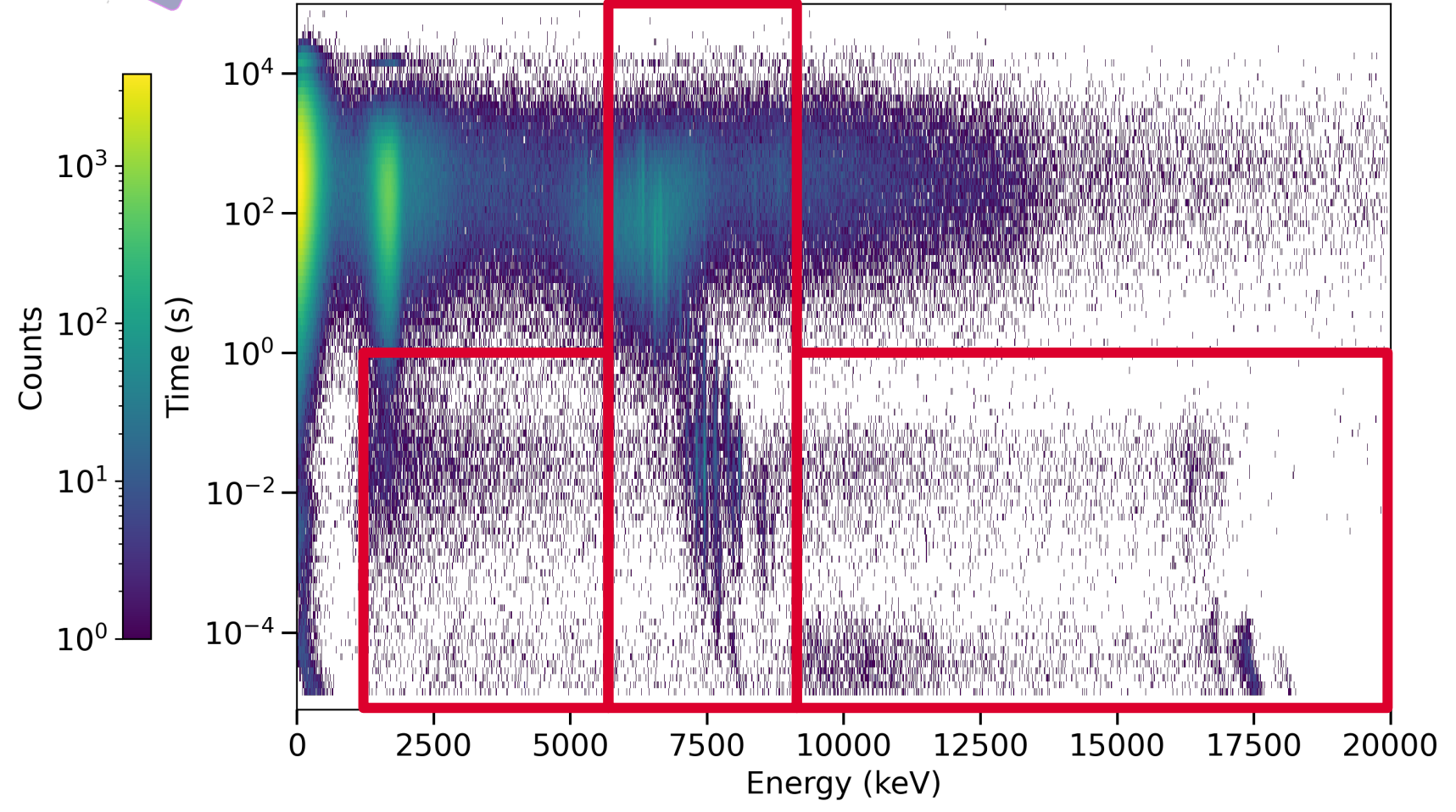
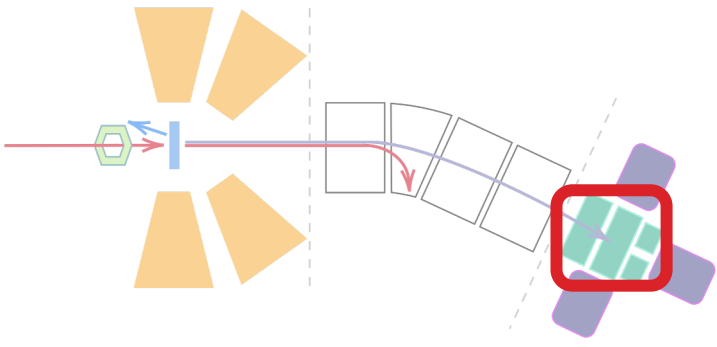


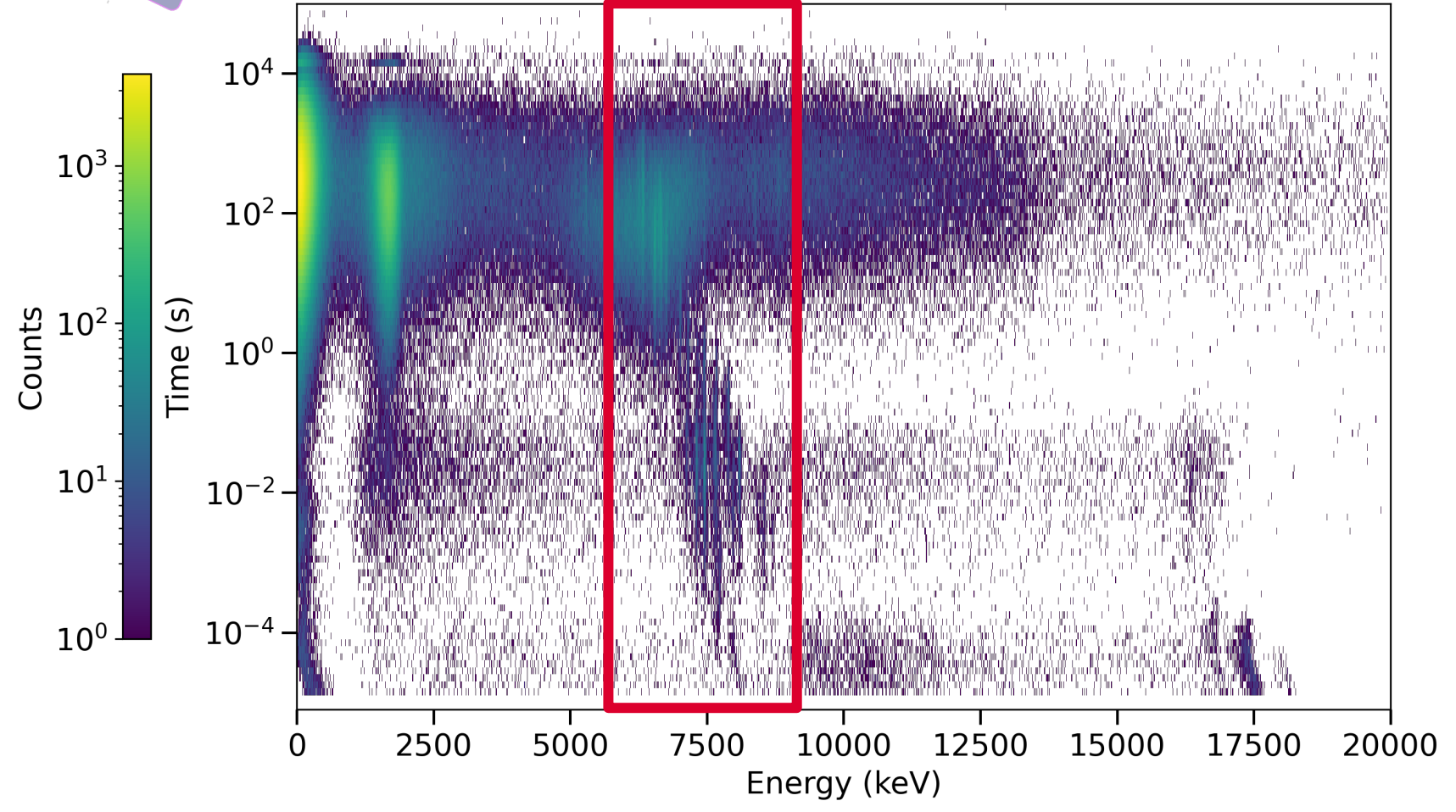
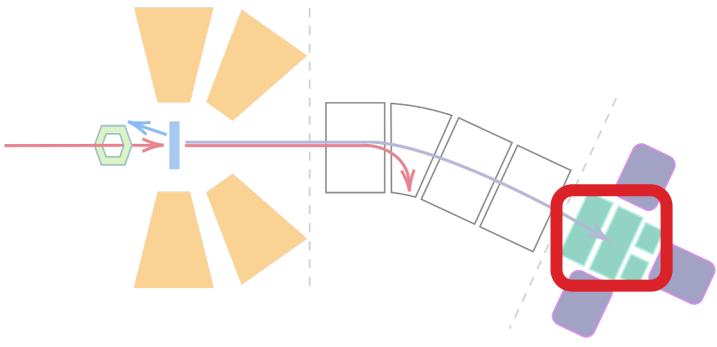
This talk
(preliminary results)

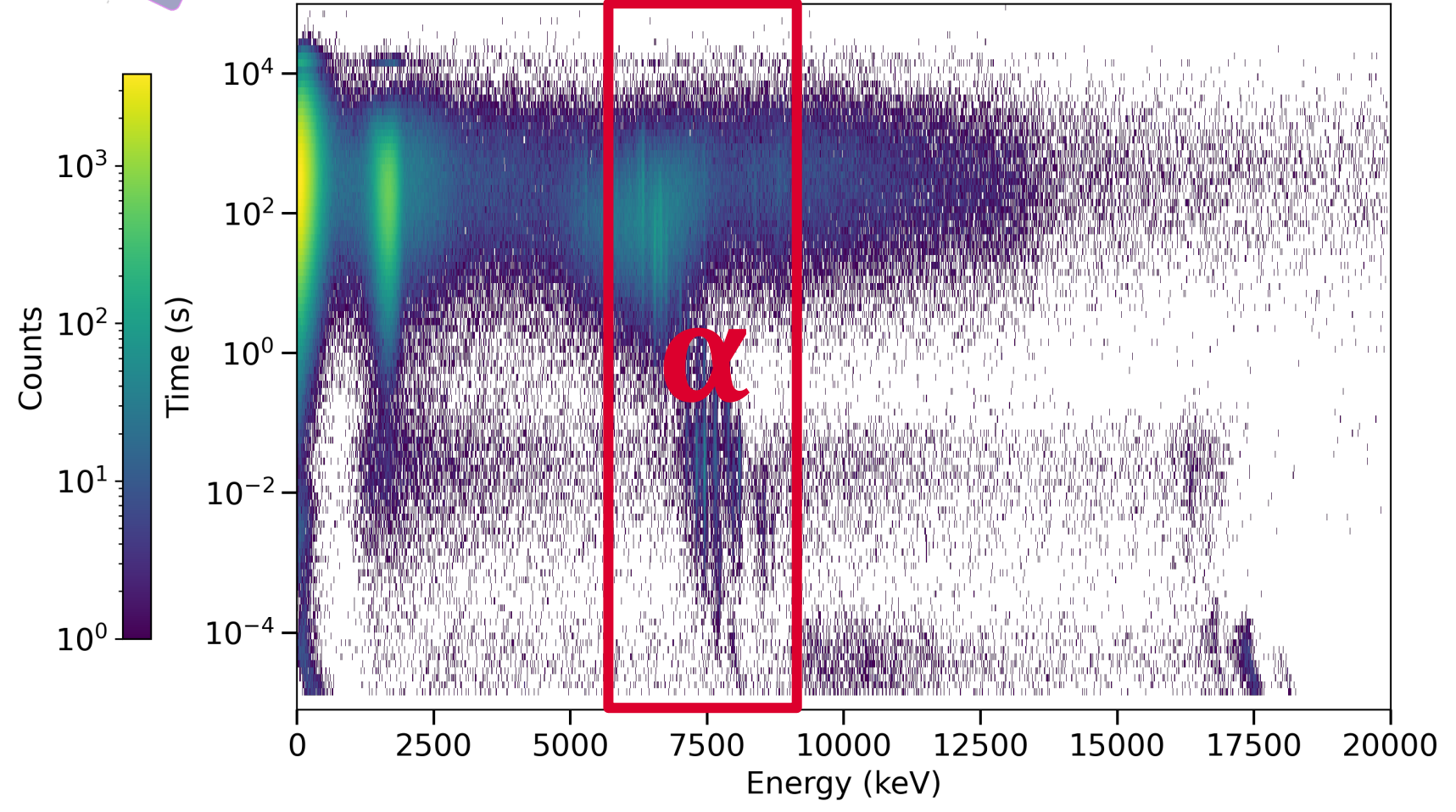
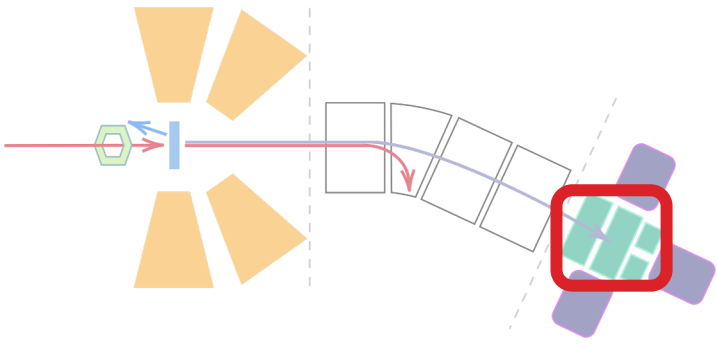


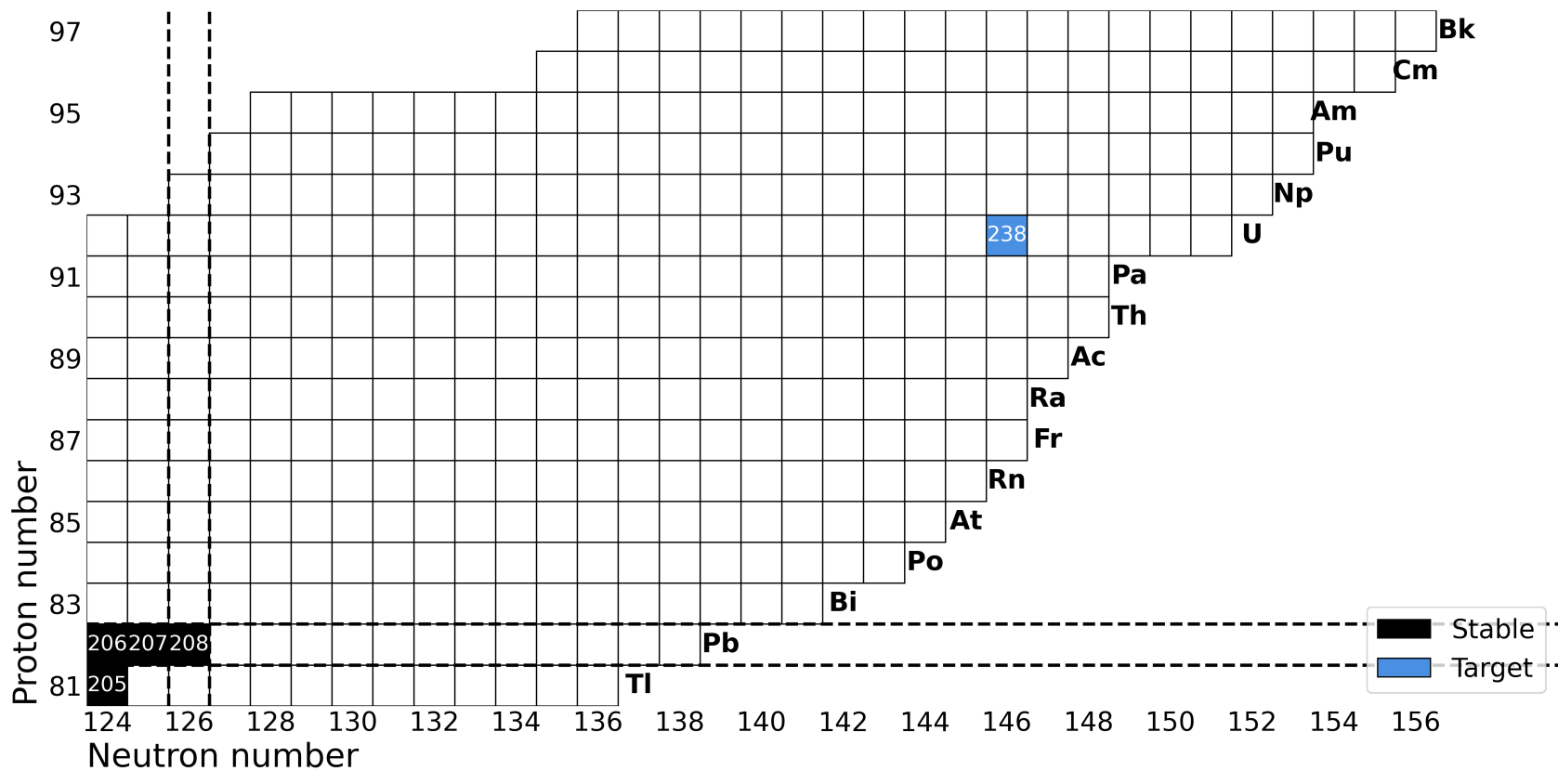
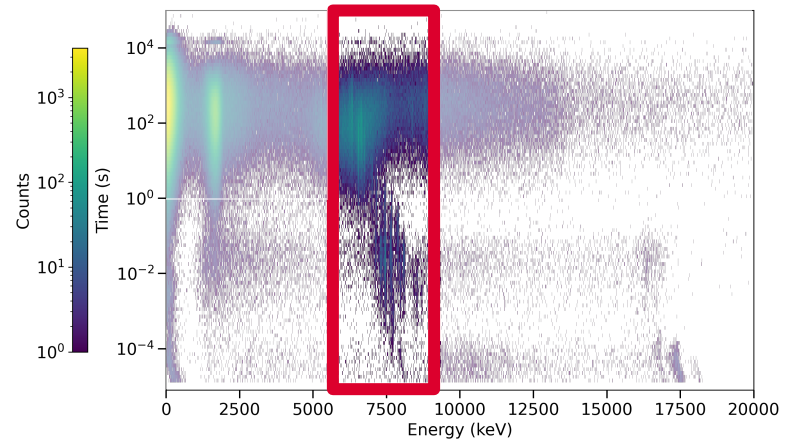
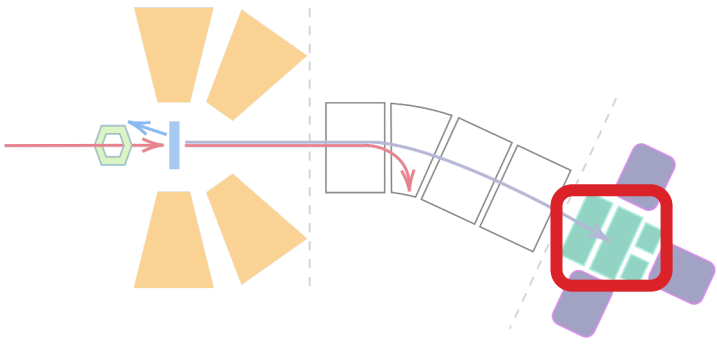


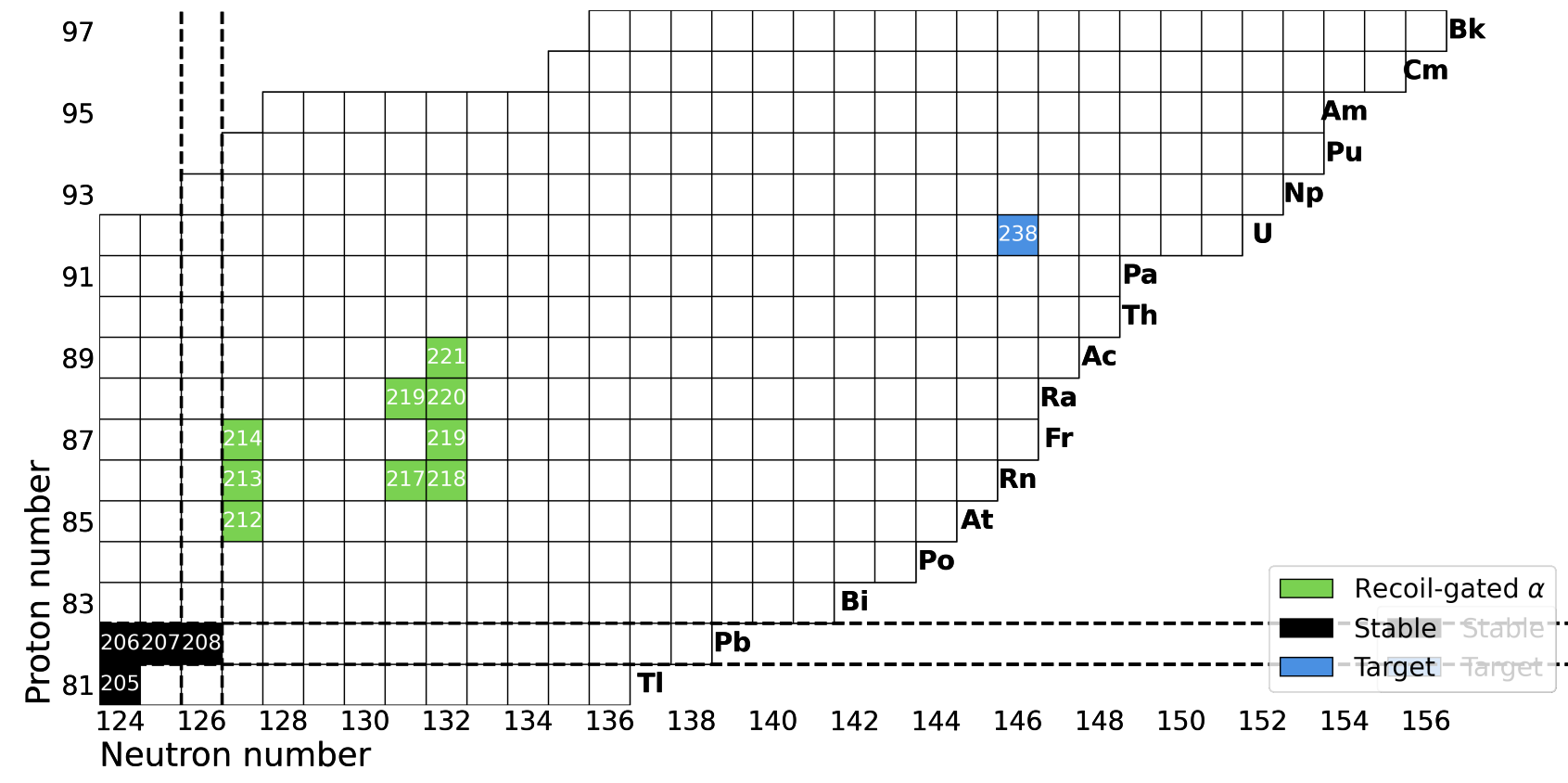
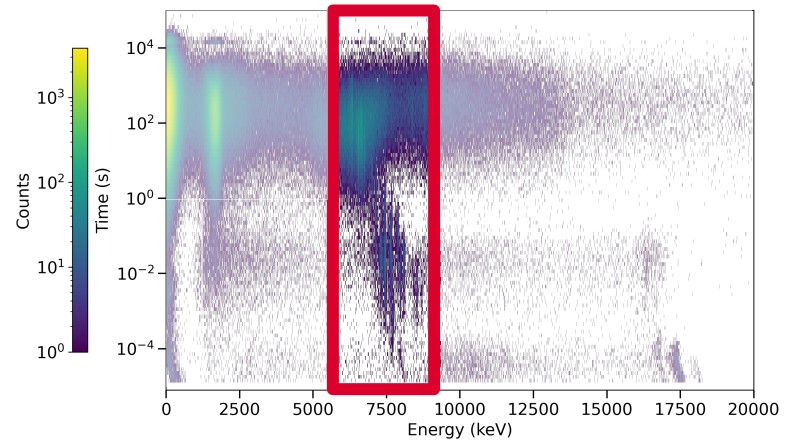
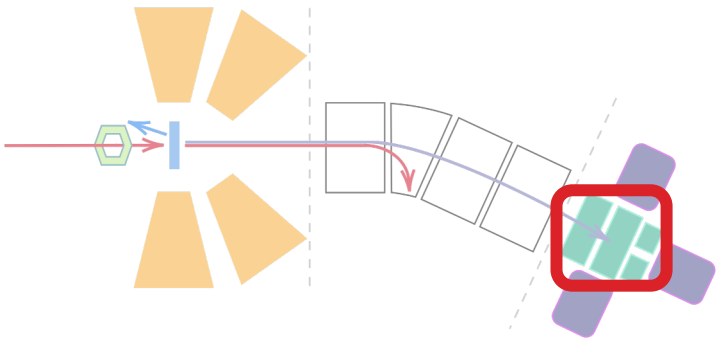


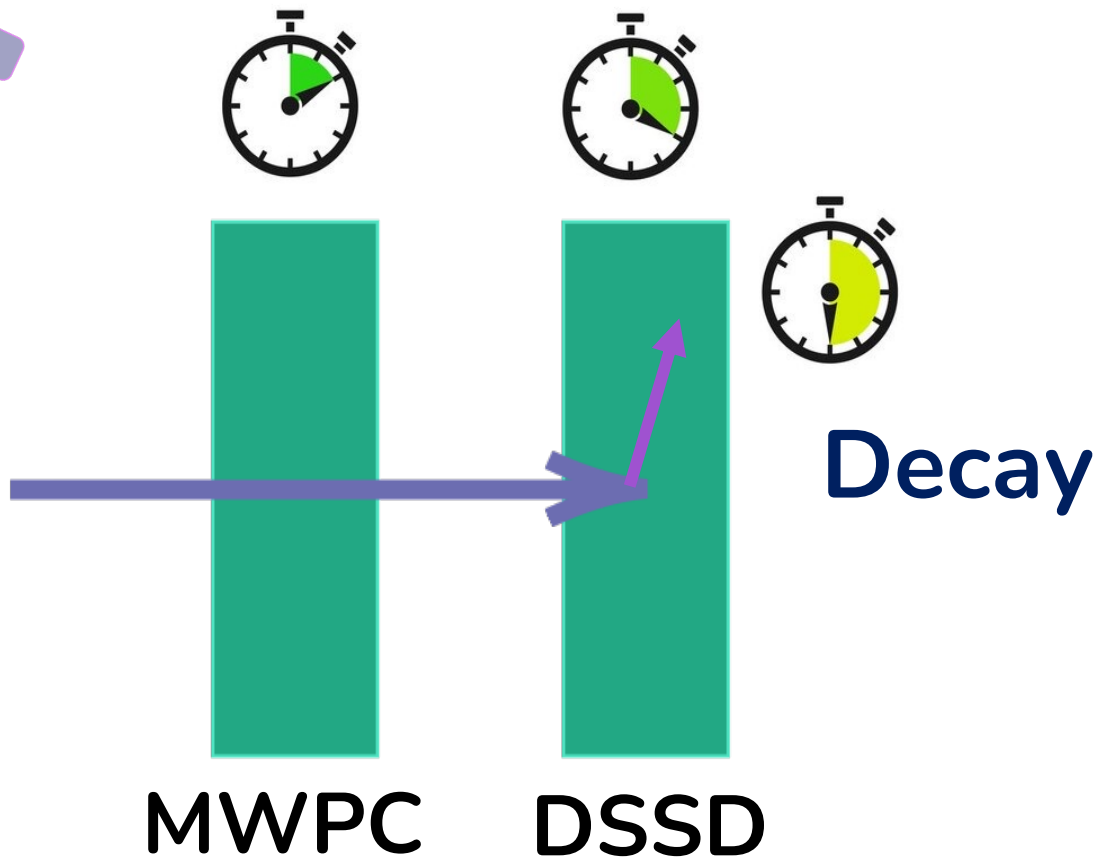
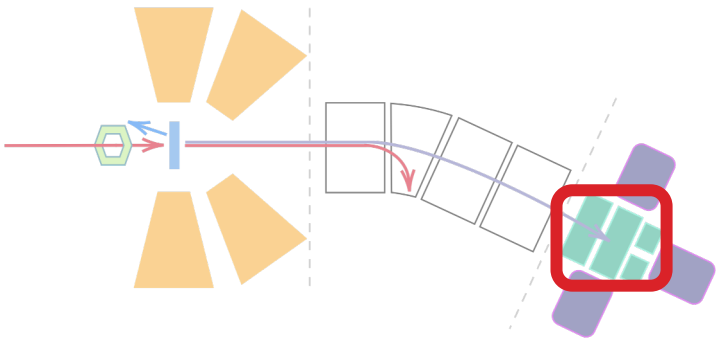


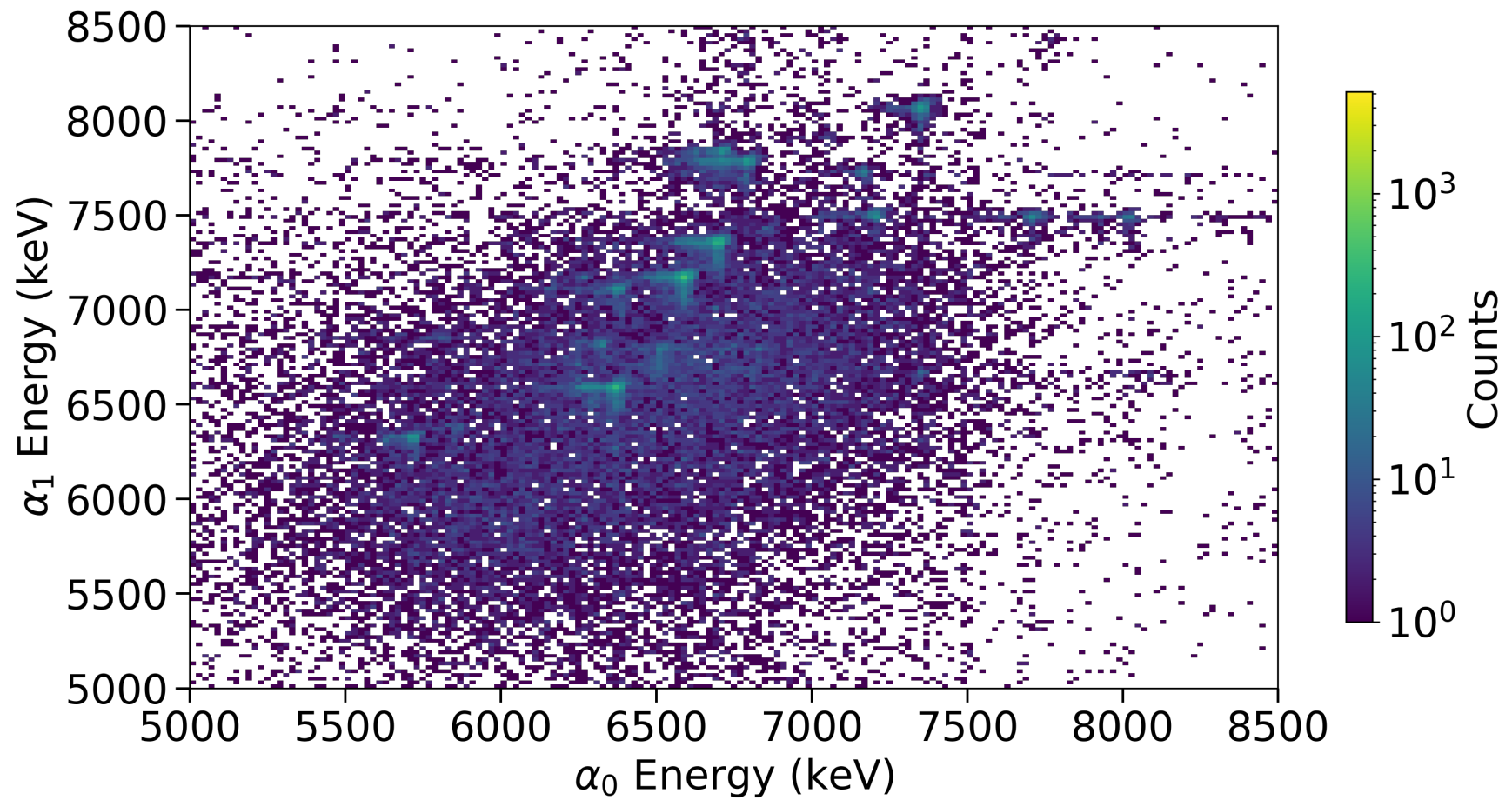


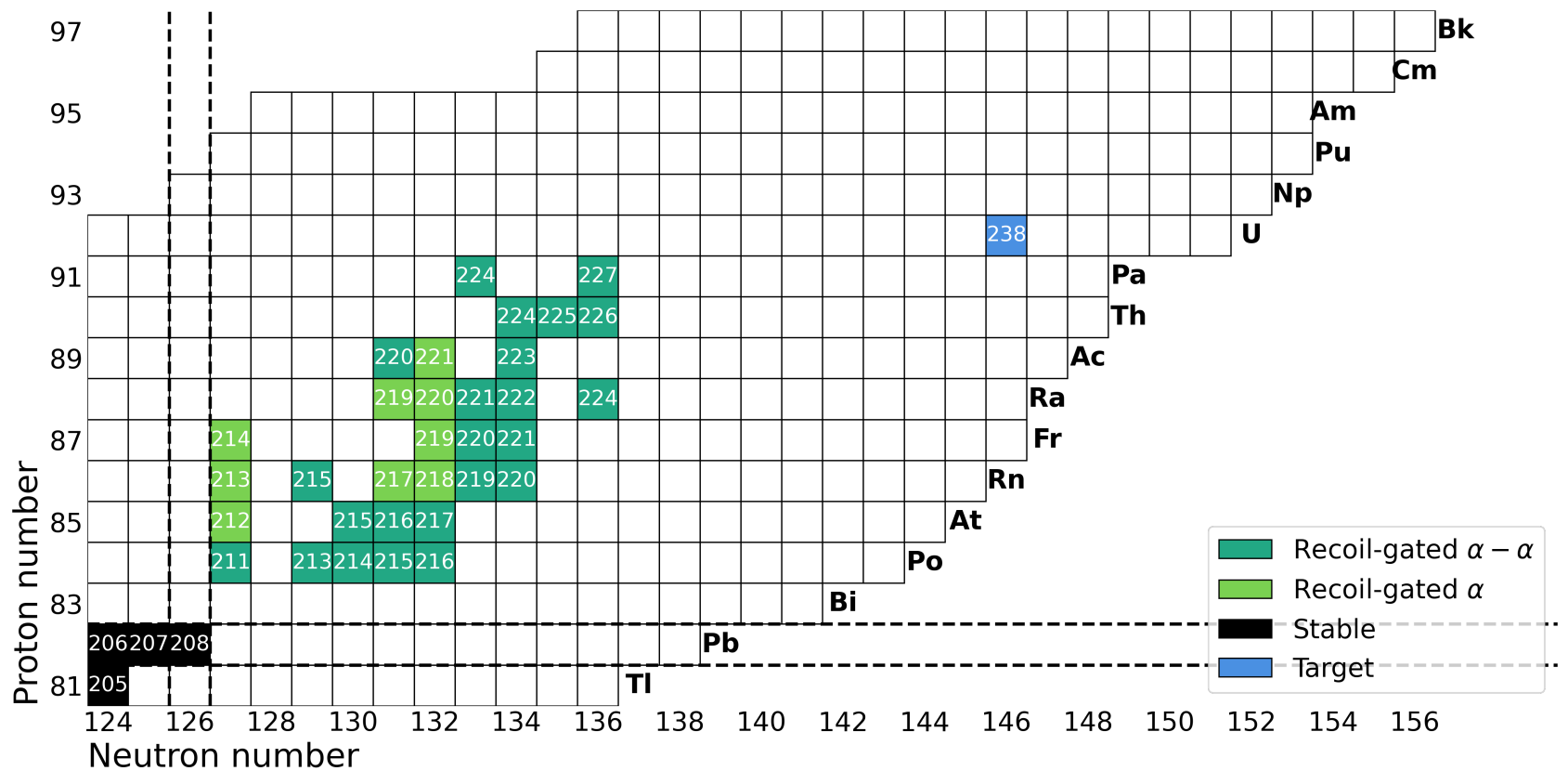
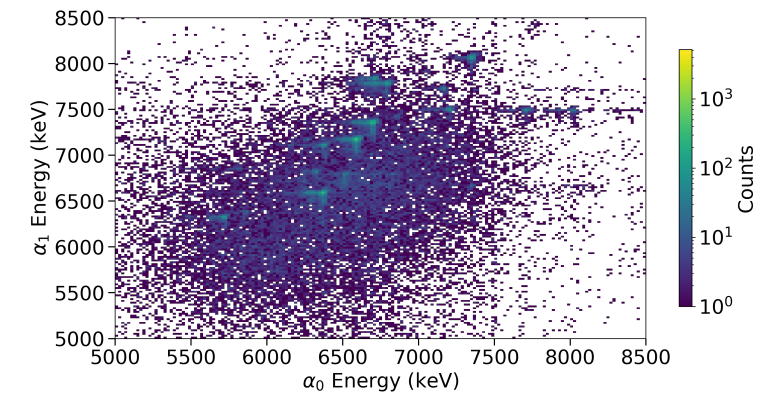
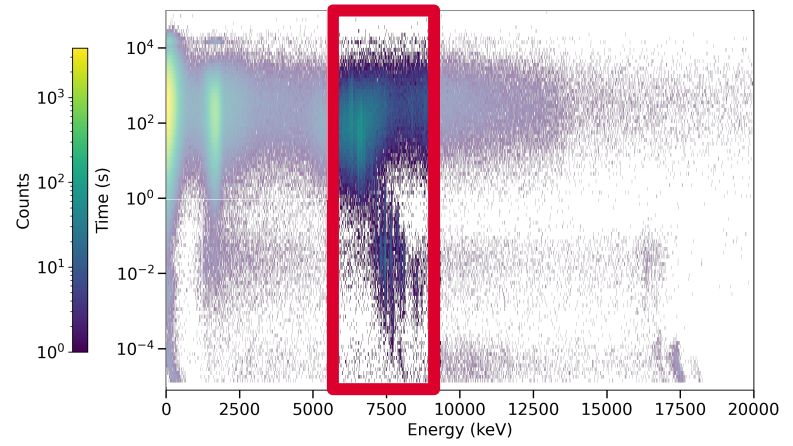
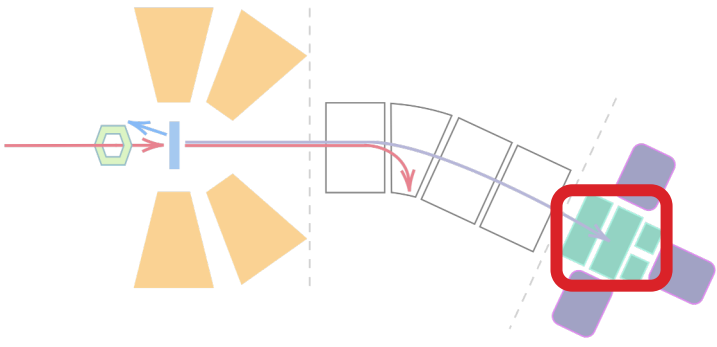


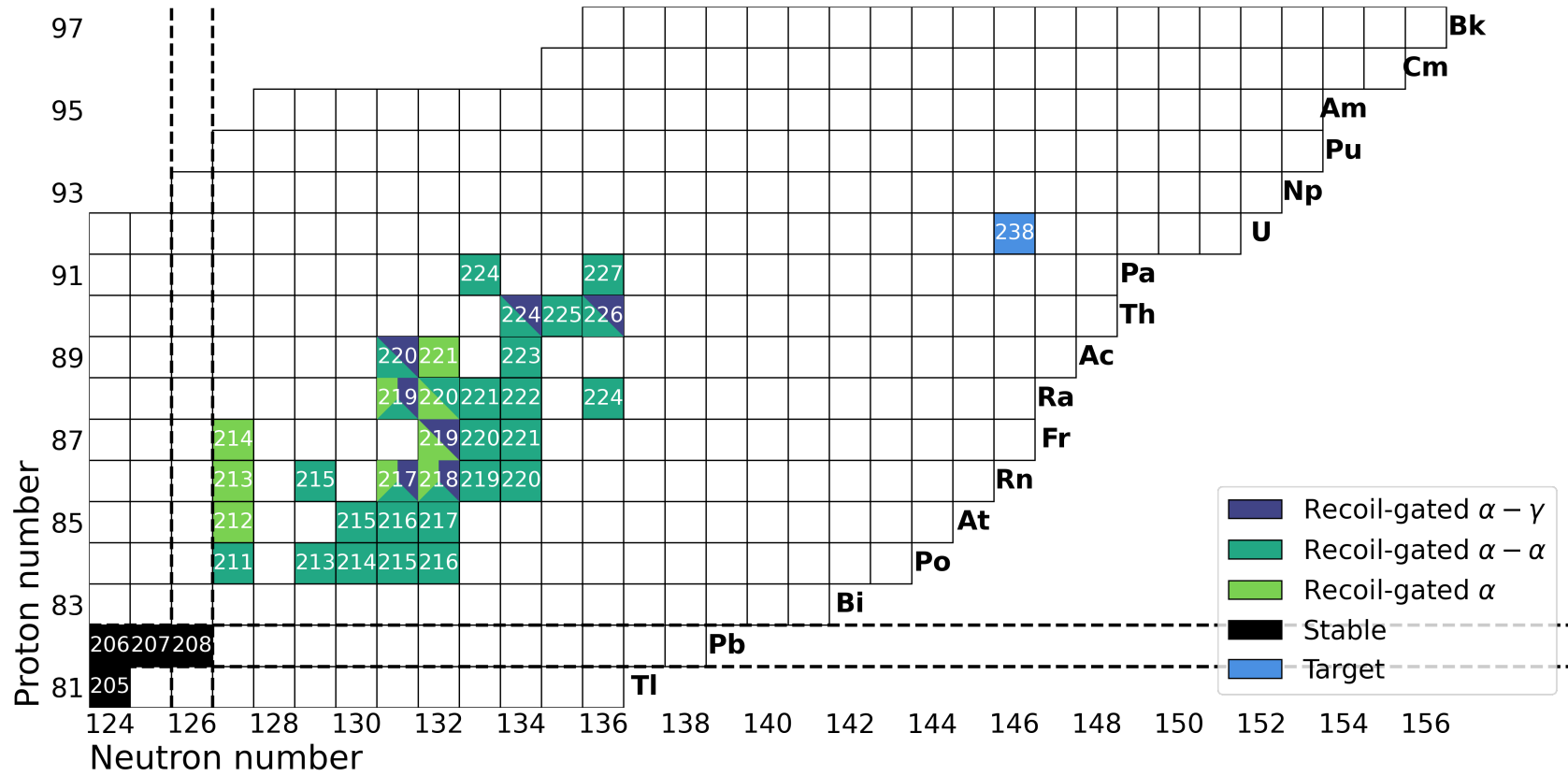
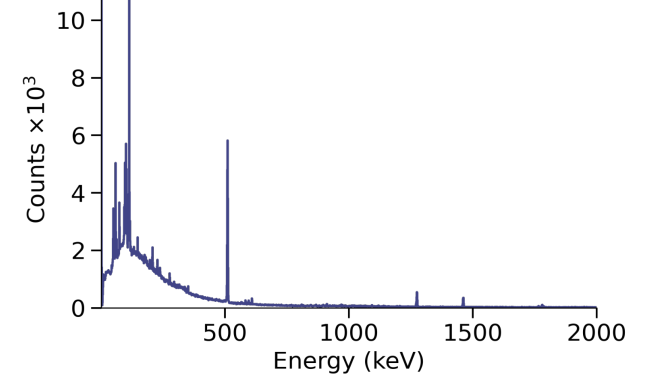
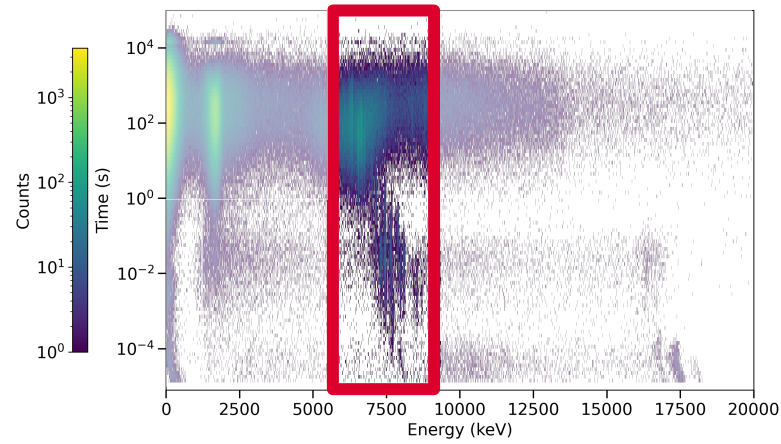
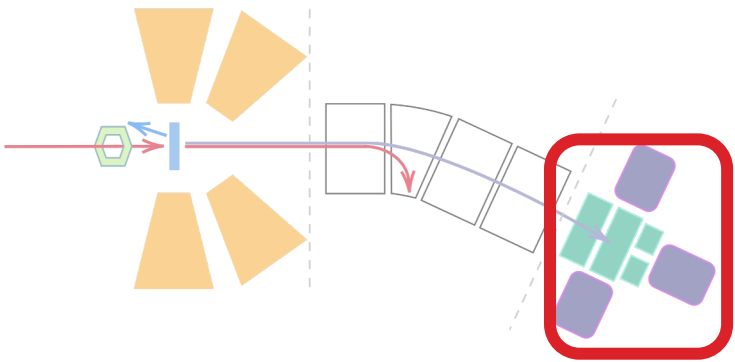


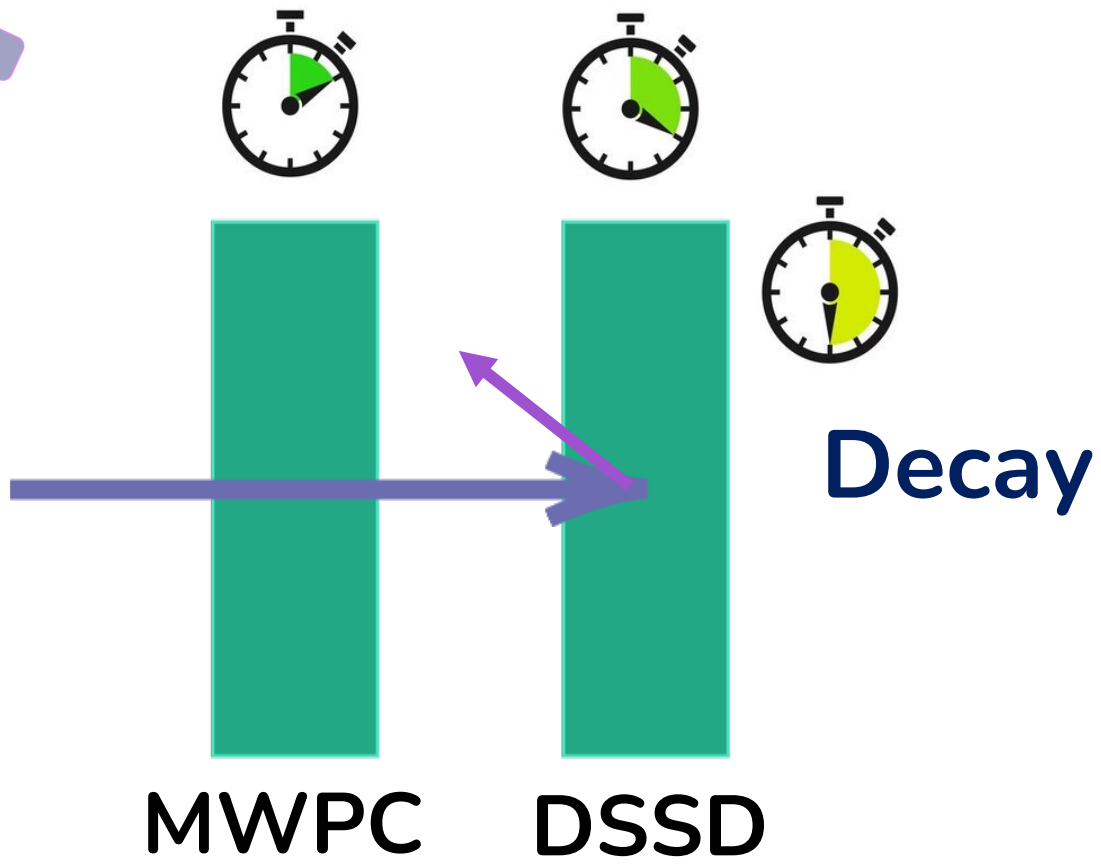
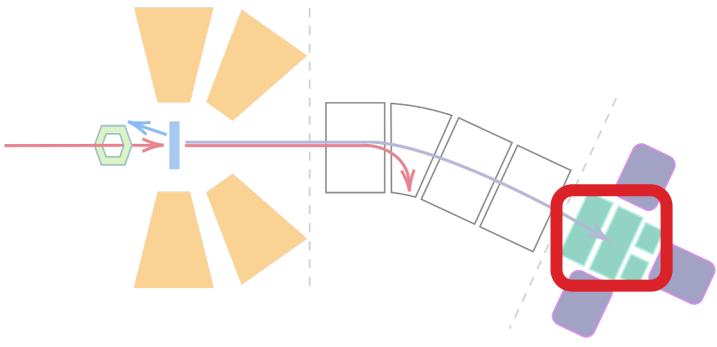


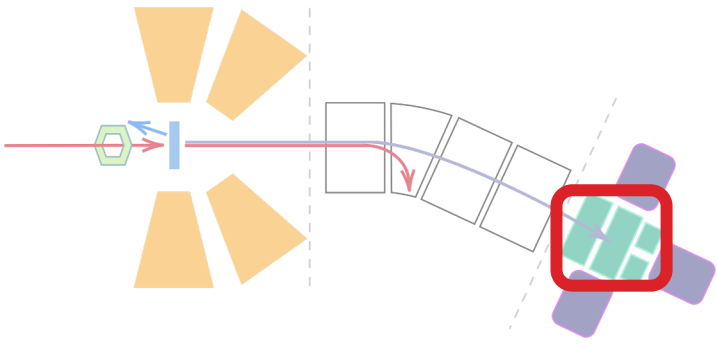




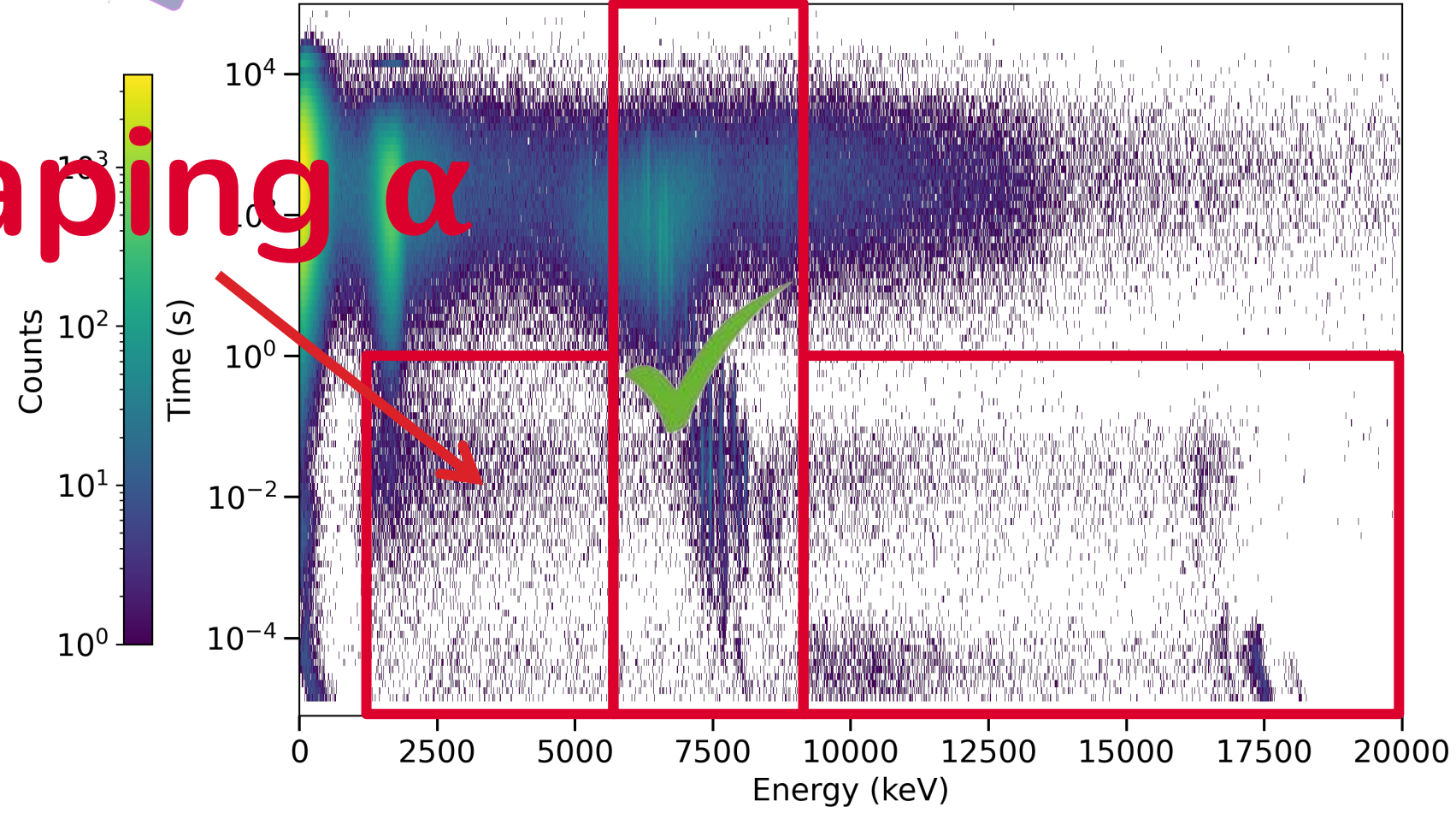


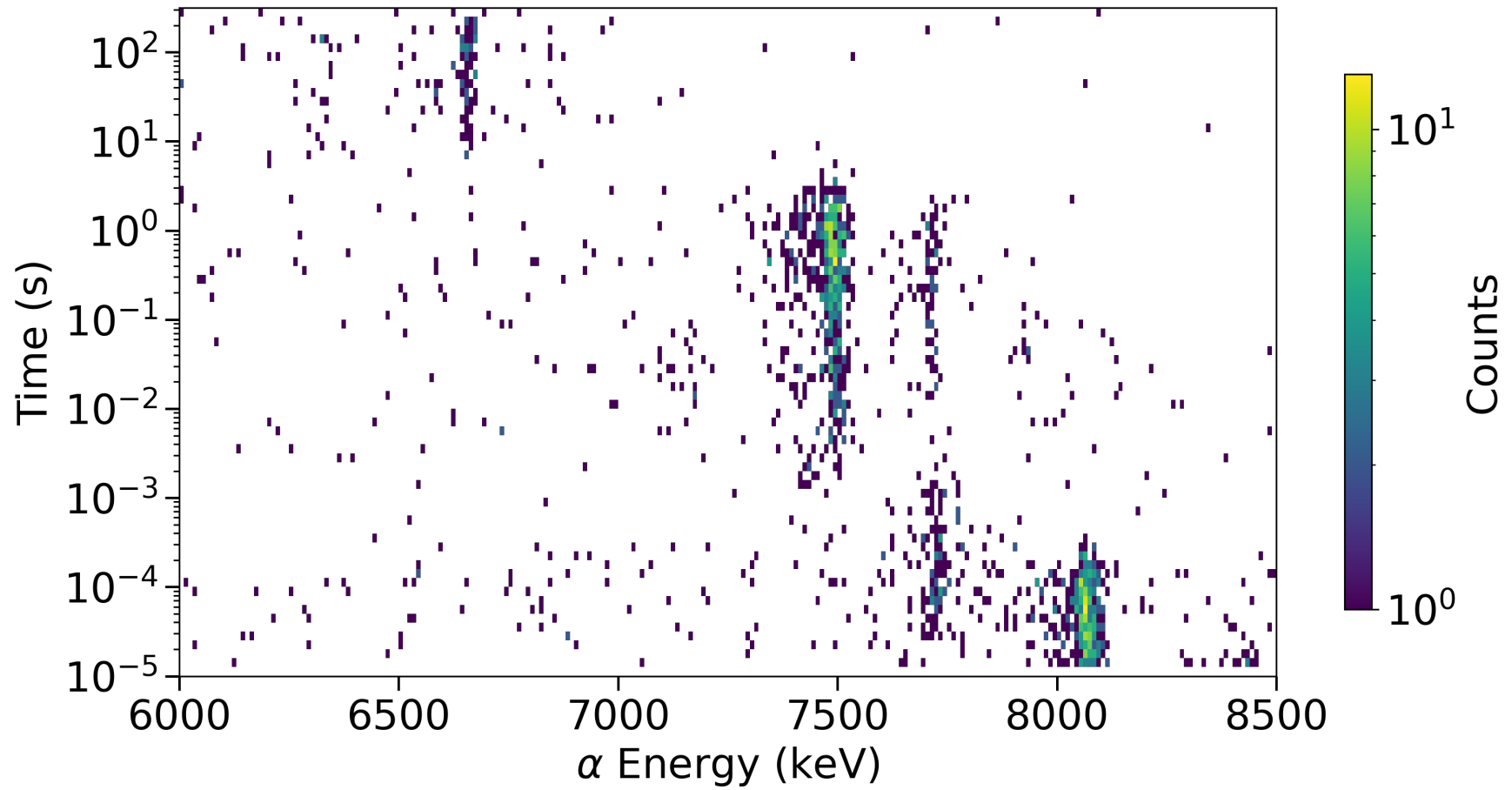


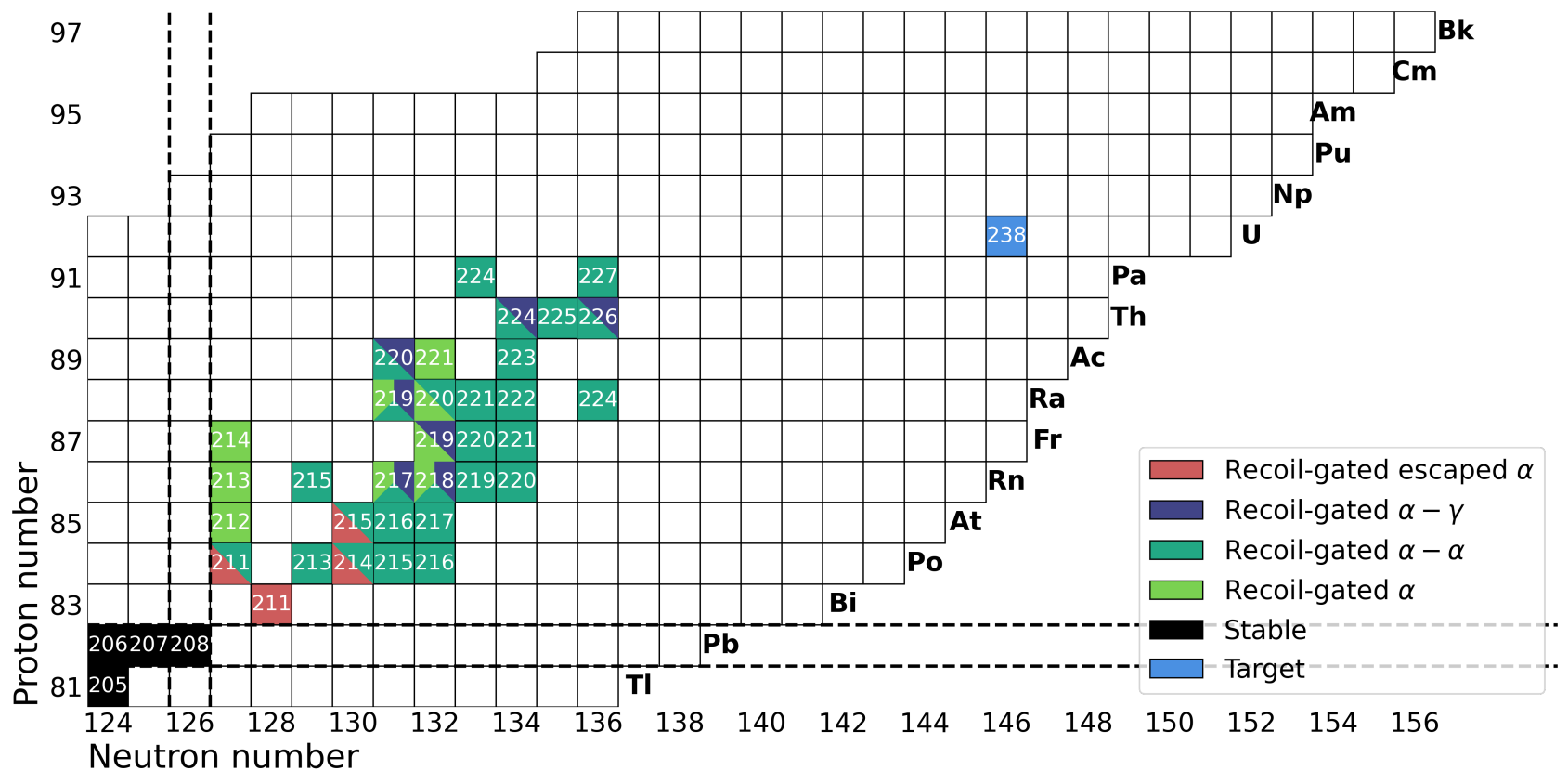
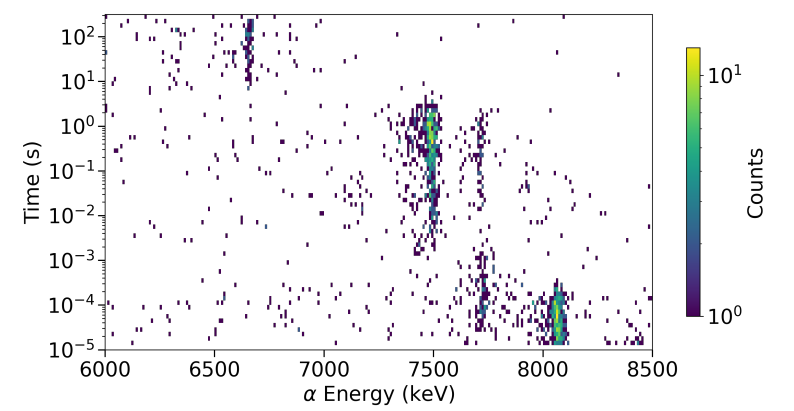
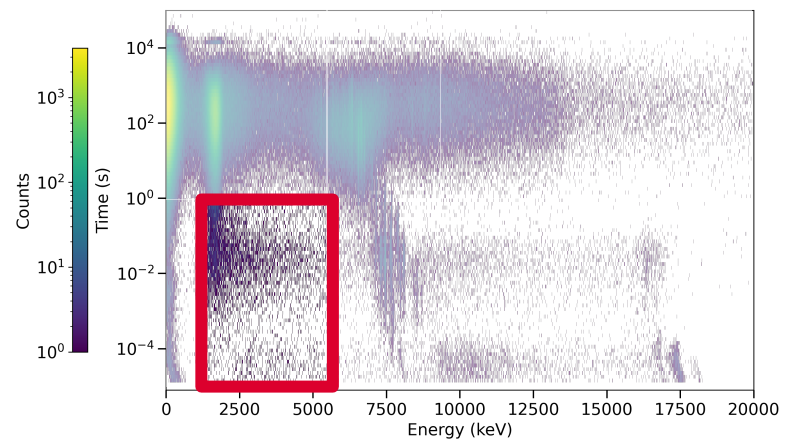
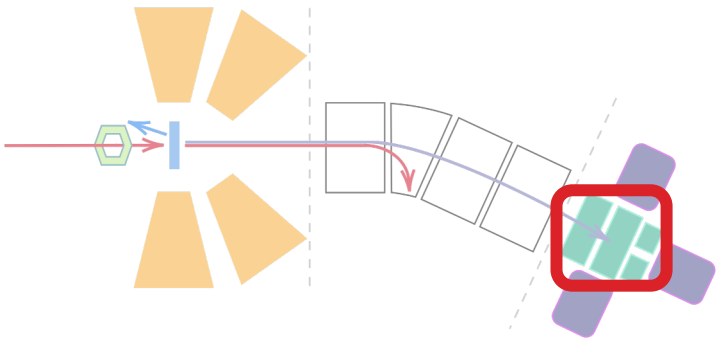


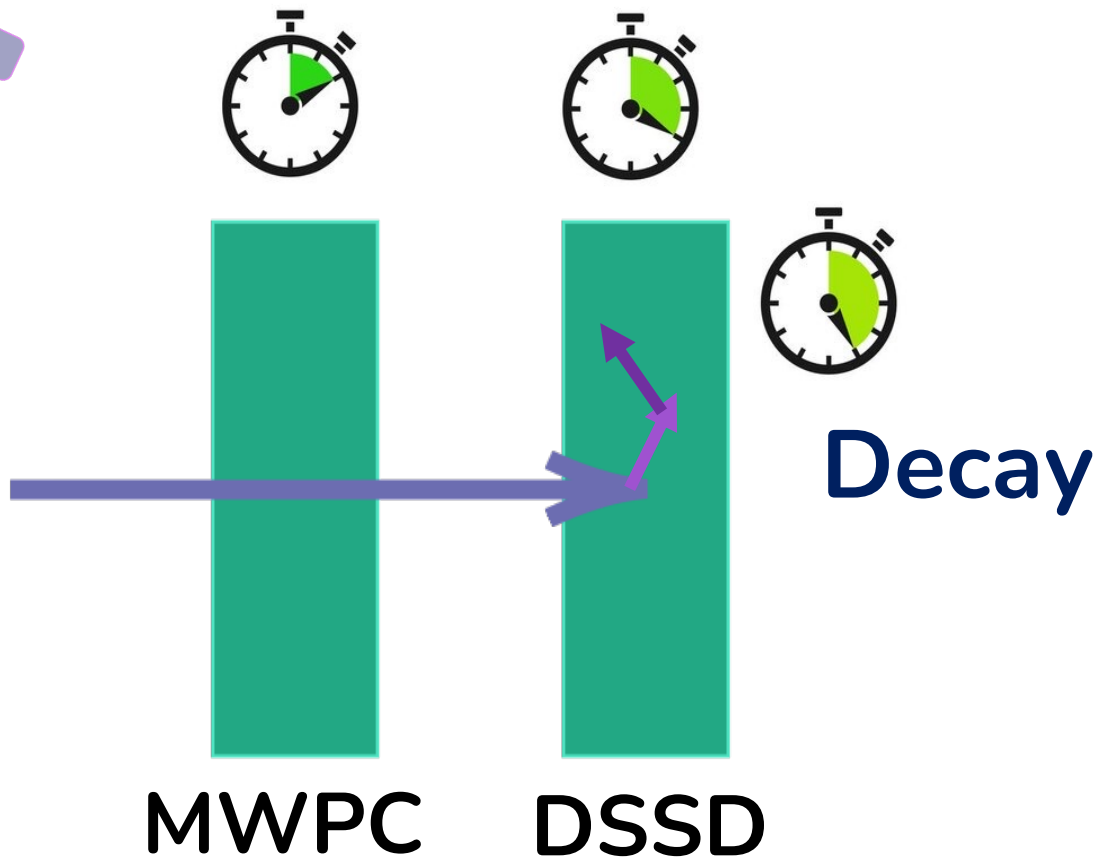
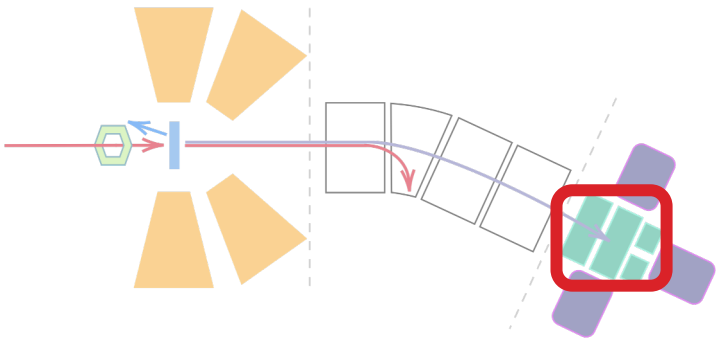


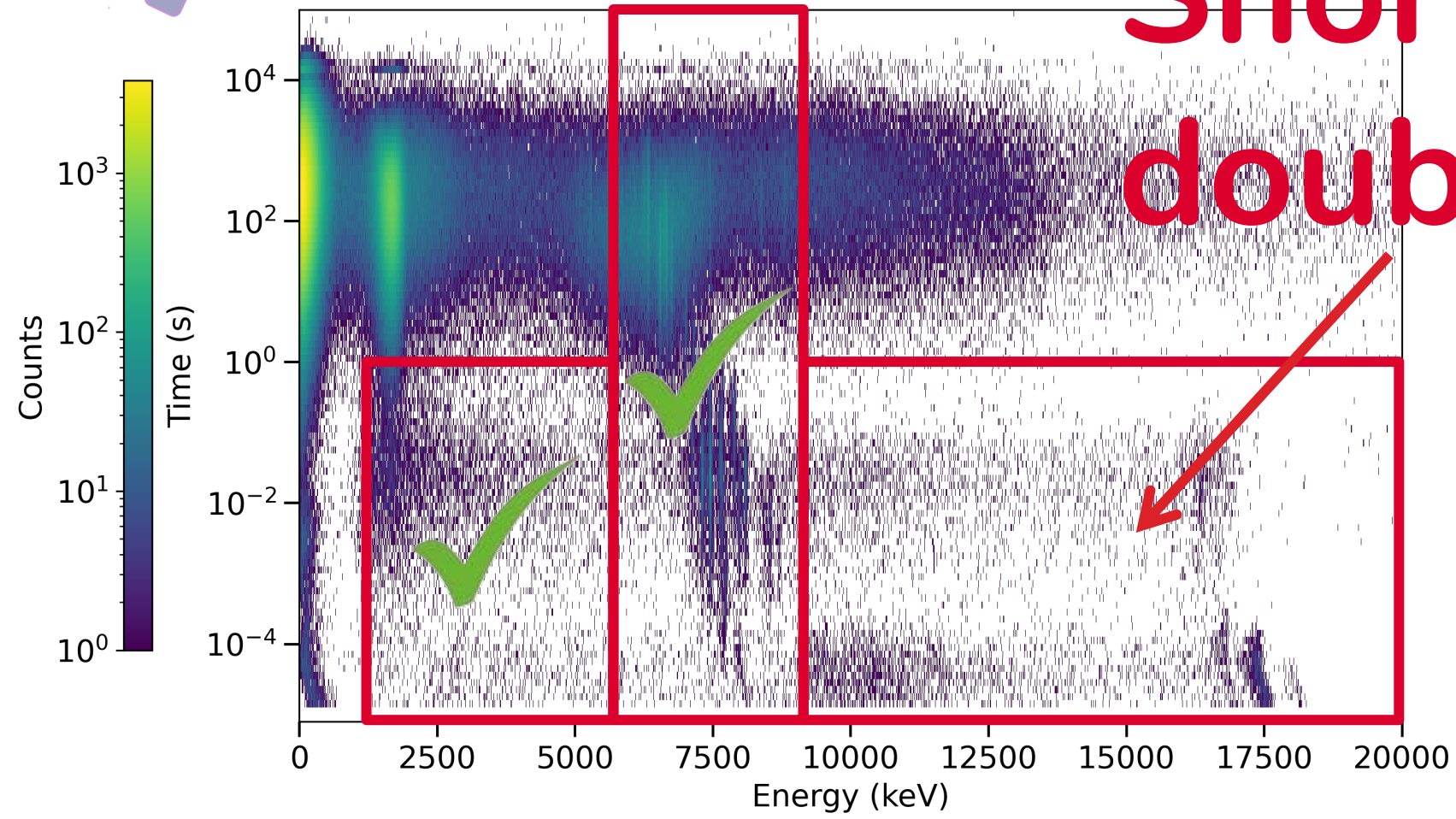
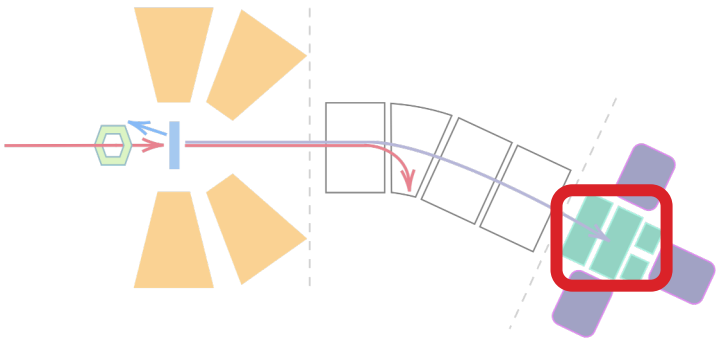
Escaping α



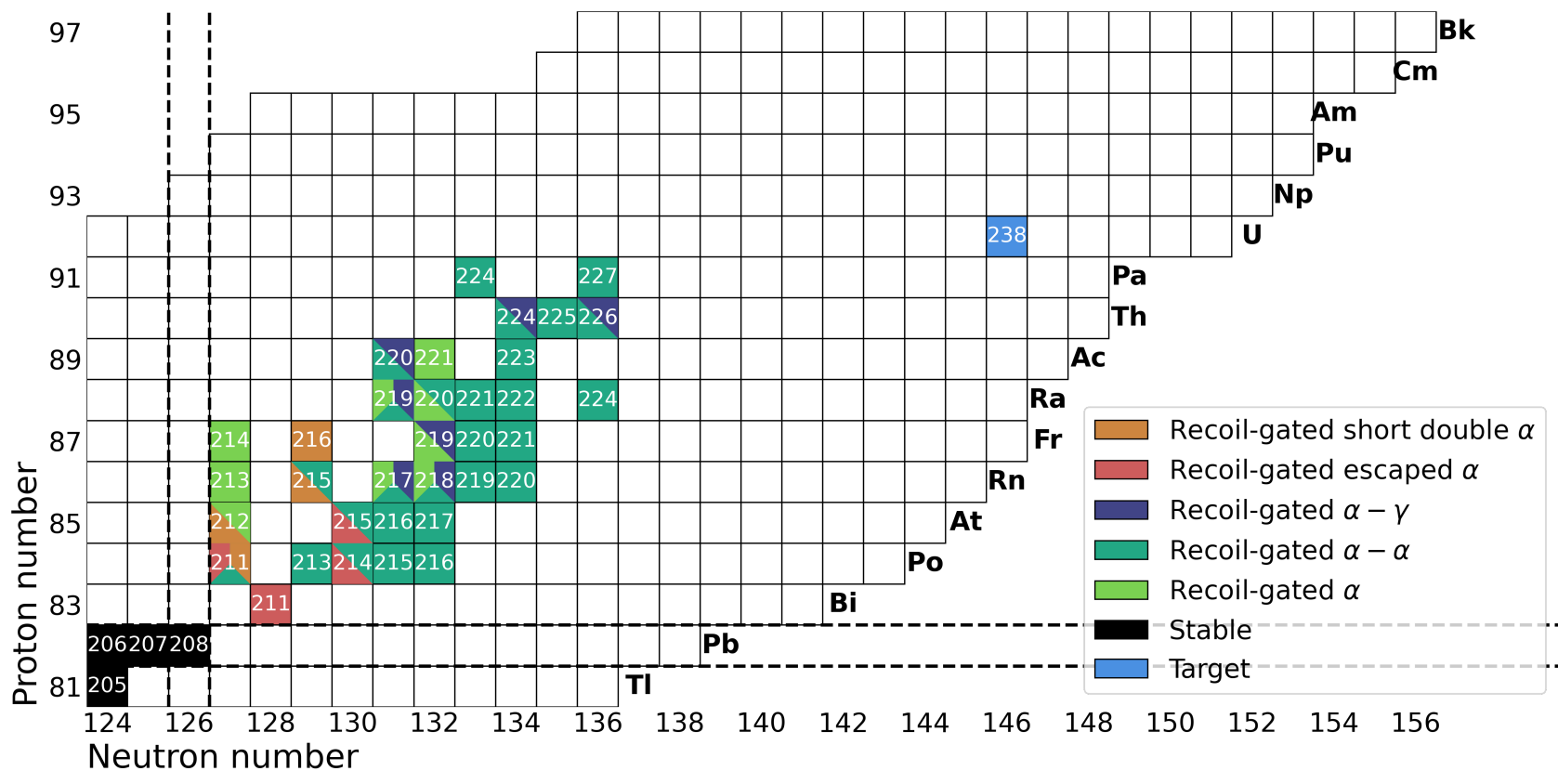
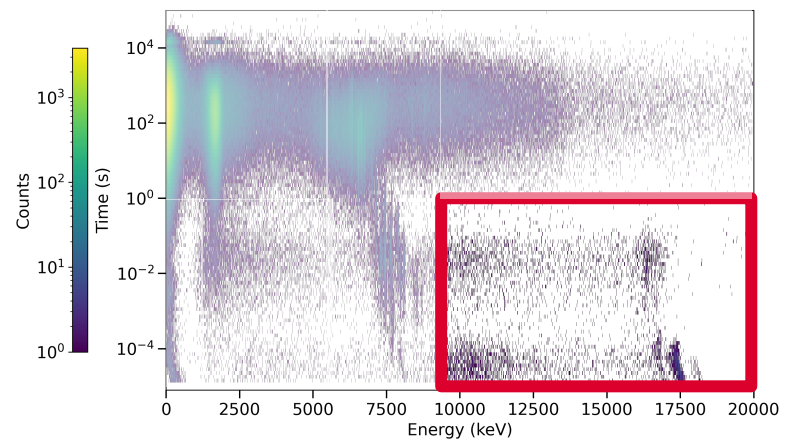
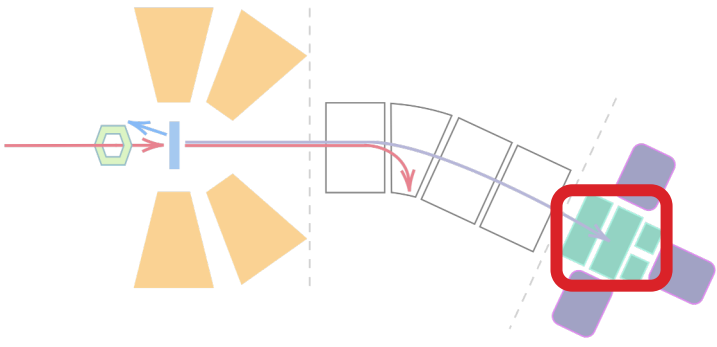


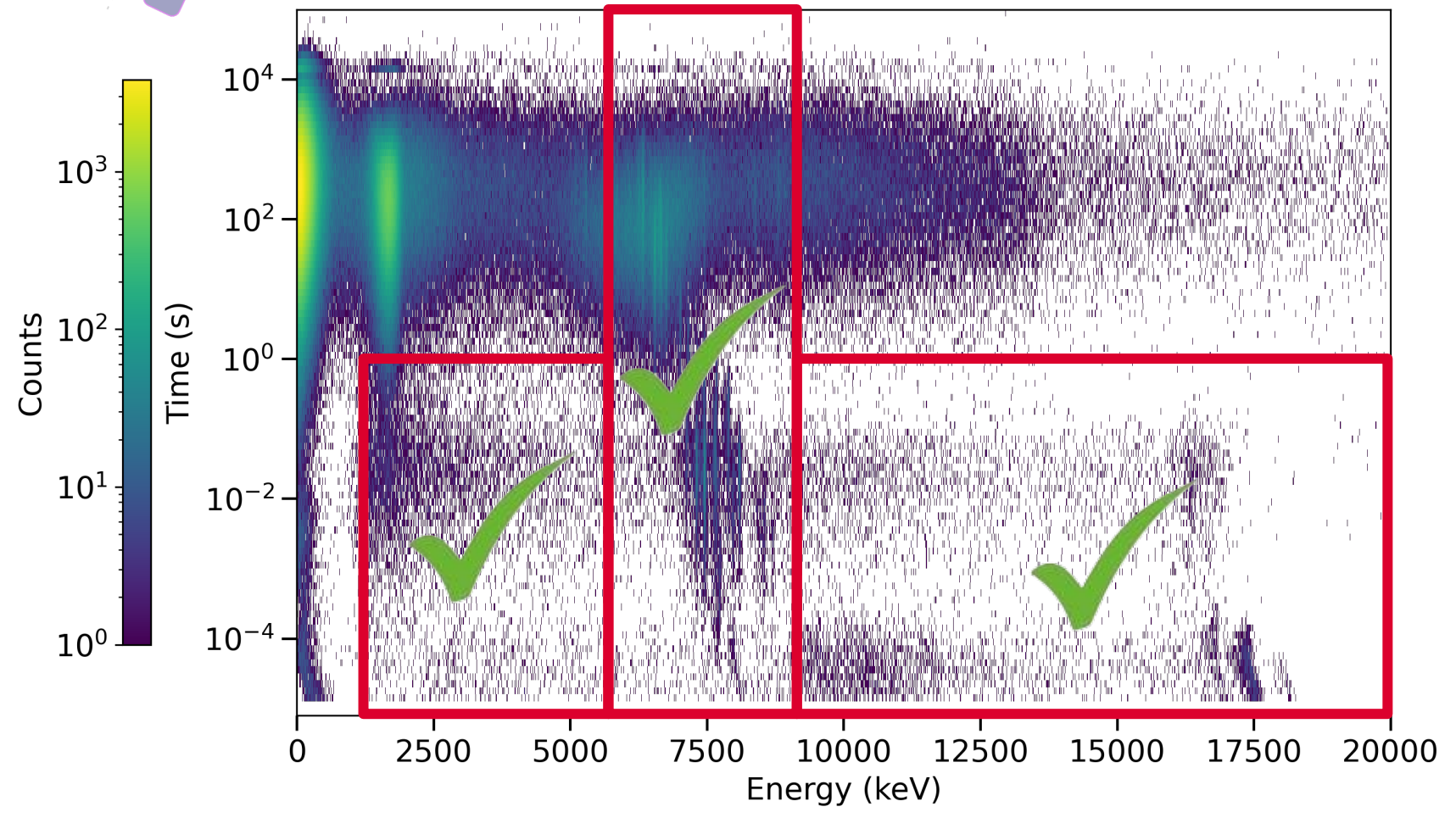
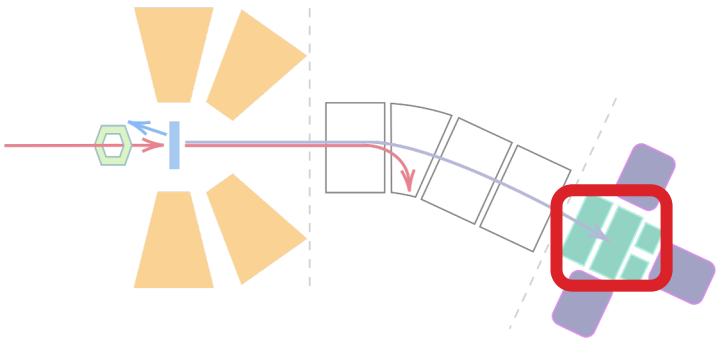


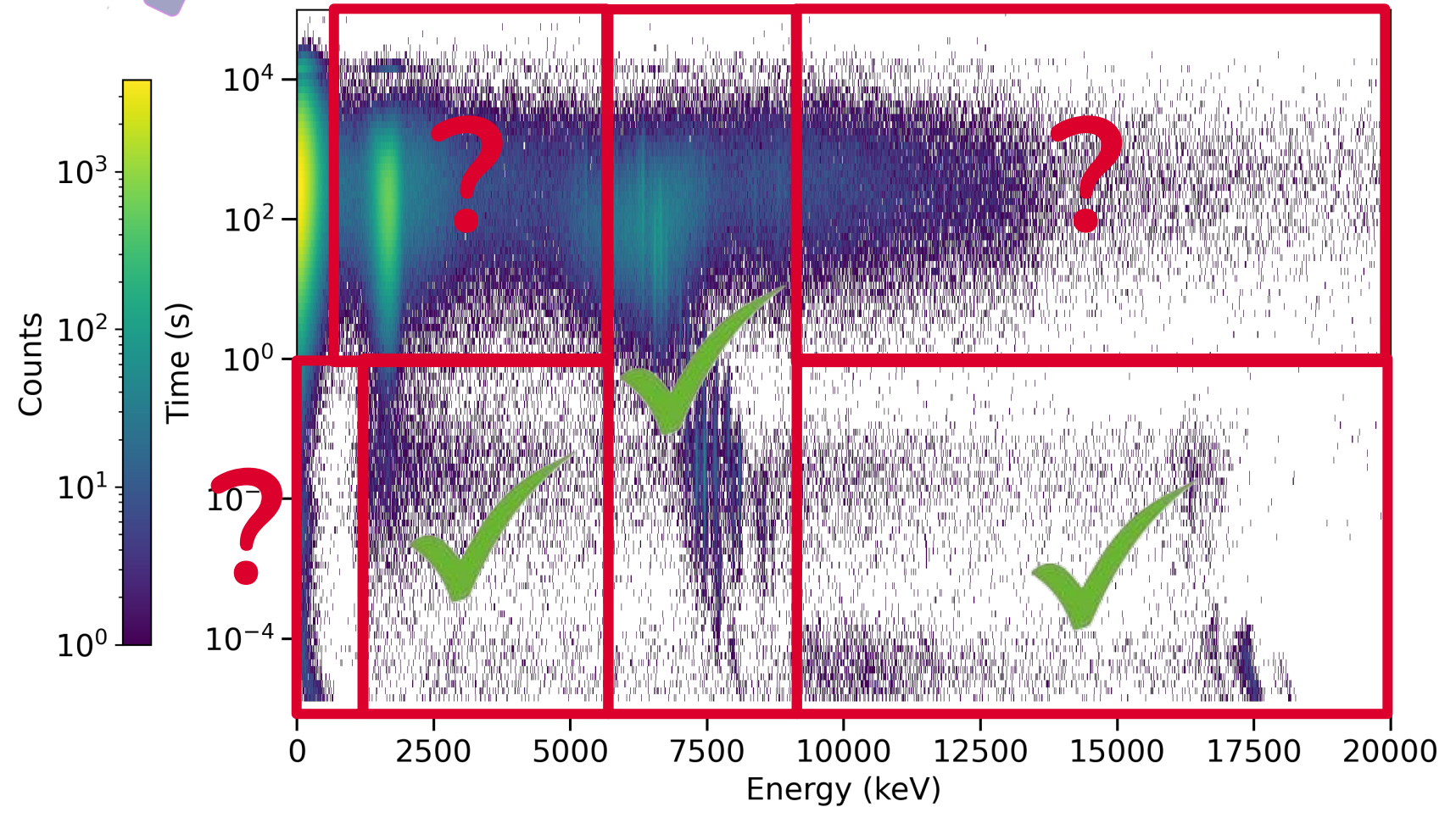
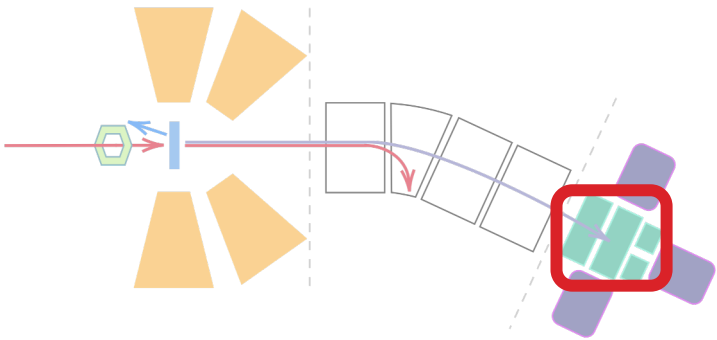


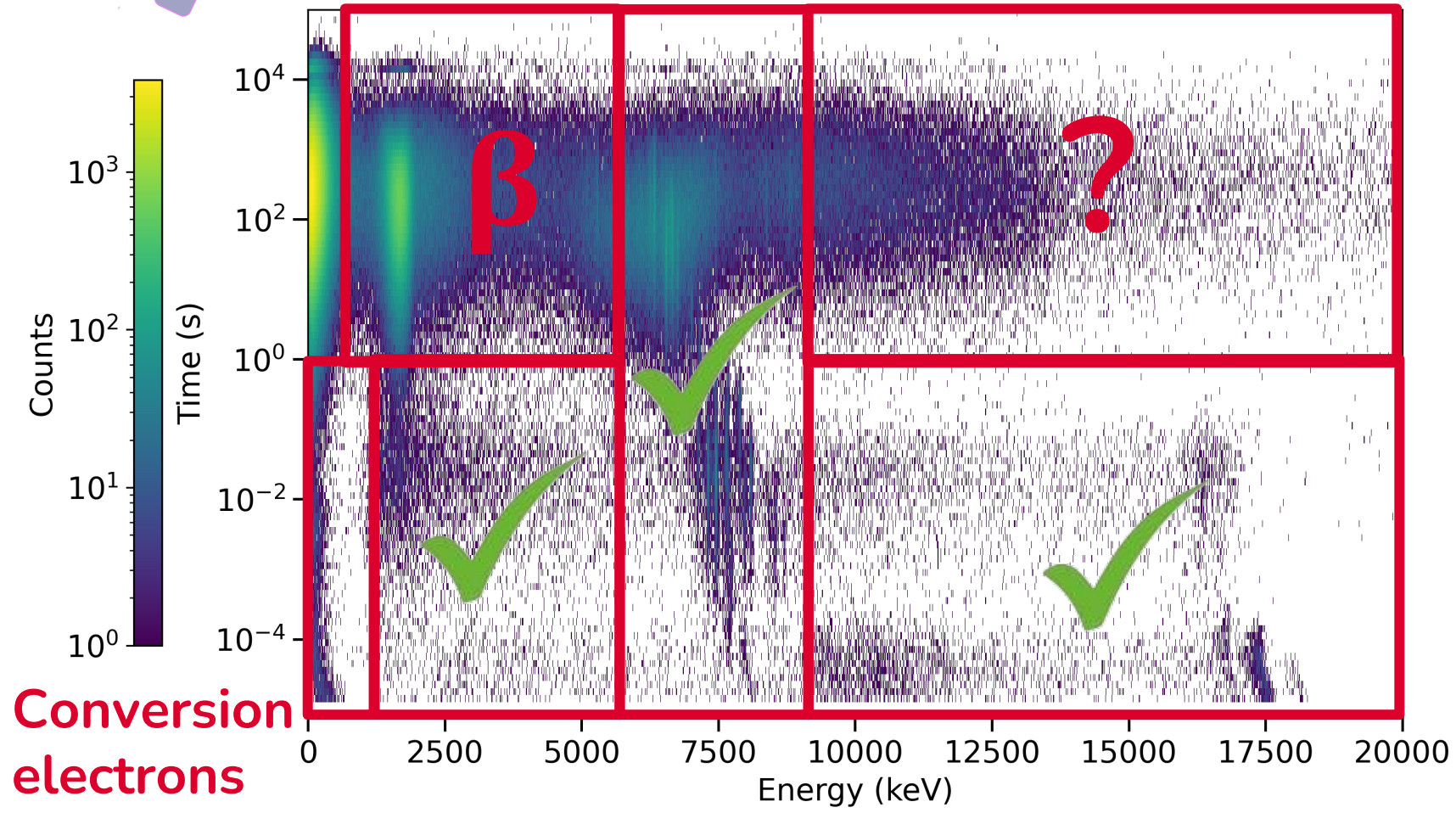
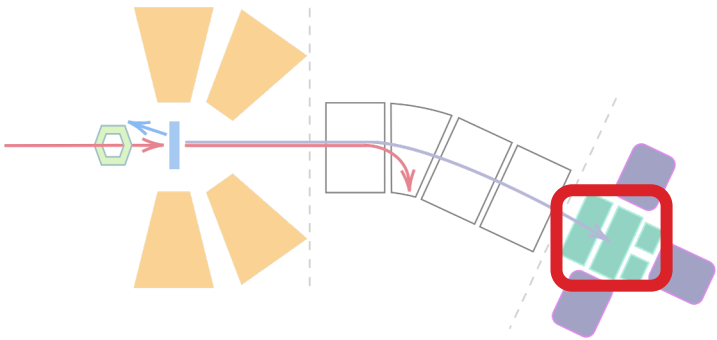


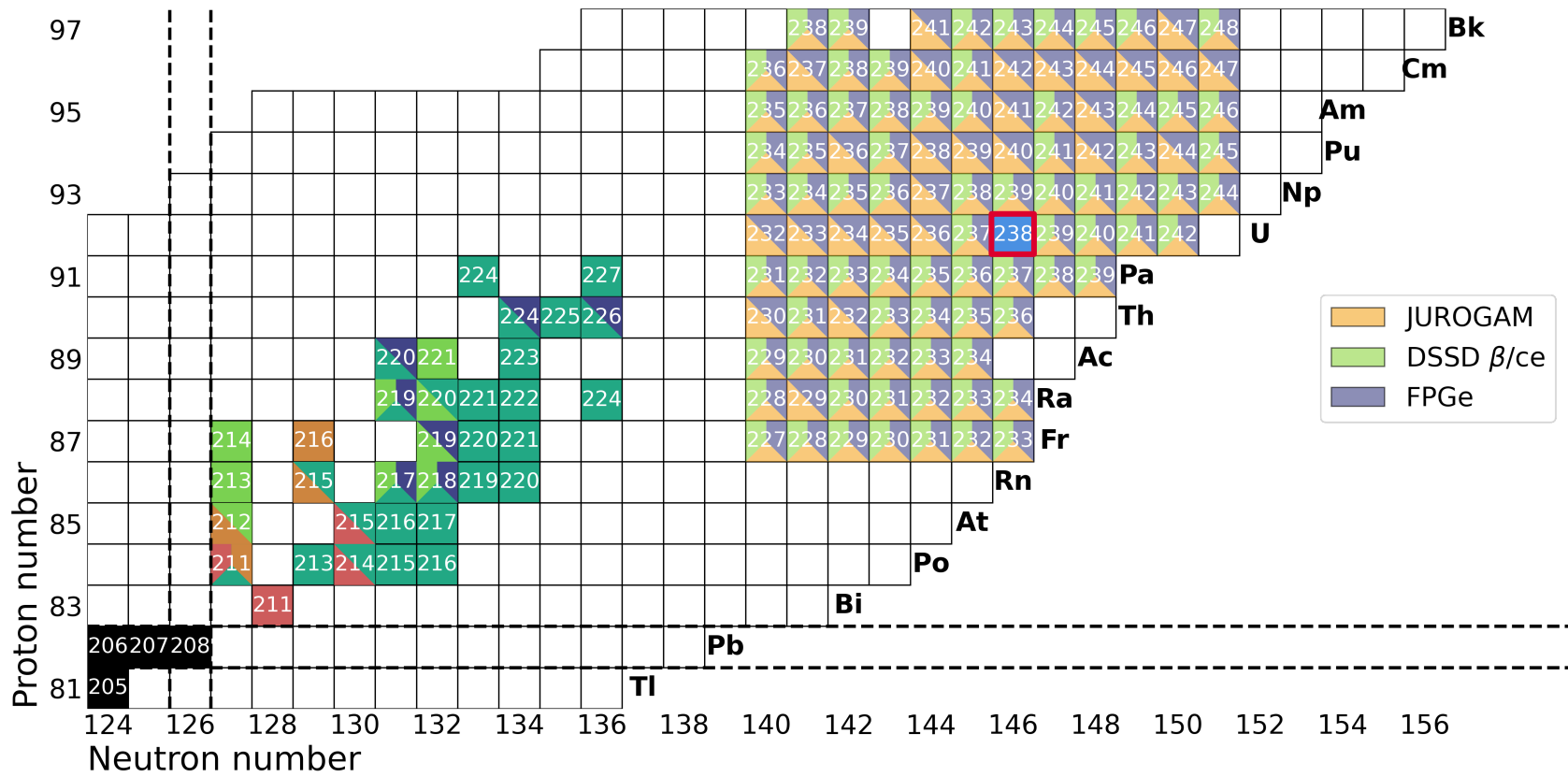
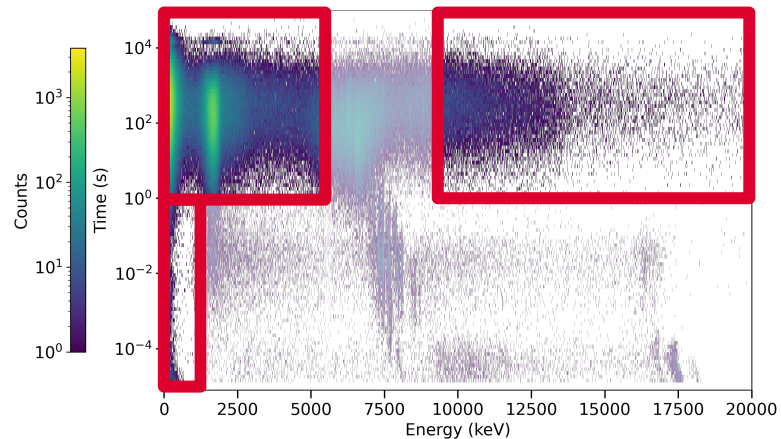
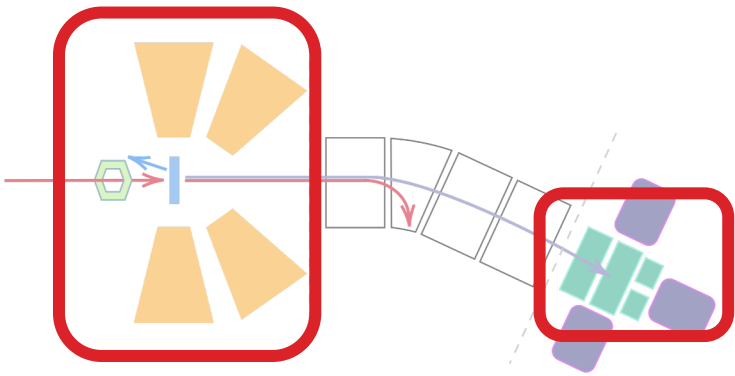
**Short
double α**











Status and Outlook

- RITU, combined with its focal plane detector setup and JUROGAM, provides a direct view of the reaction mechanism.
- So far, 32 isotopes have been identified, and the search for more is ongoing.
- The next steps include:
 - Analysis of the JYTube detector data to search for projectile-like partners emitted close to 180° ,
 - Analysis of the gamma spectra of JUROGAM,
 - Determination of cross-sections.

Acknowledgments

J. Even¹, K. Auranen², O. Beliuskina², J. Chadderton³, F. Giacoppo⁴, S. Heinz⁴, A. Illana⁵, A. Kankainen², H. Kokkonen², W.N. Landsman², A. McCarter³, J. Pakarinen², P. Rahkila², P. Ruotsalainen², J. Sarén², E. Uusikylä², J. Uusitalo²

¹University of Groningen, The Netherlands;

²University of Jyväskylä, Finland;

³University of Liverpool, United Kingdom;

⁴GSI Helmholtzzentrum für Schwerionenforschung, Germany;

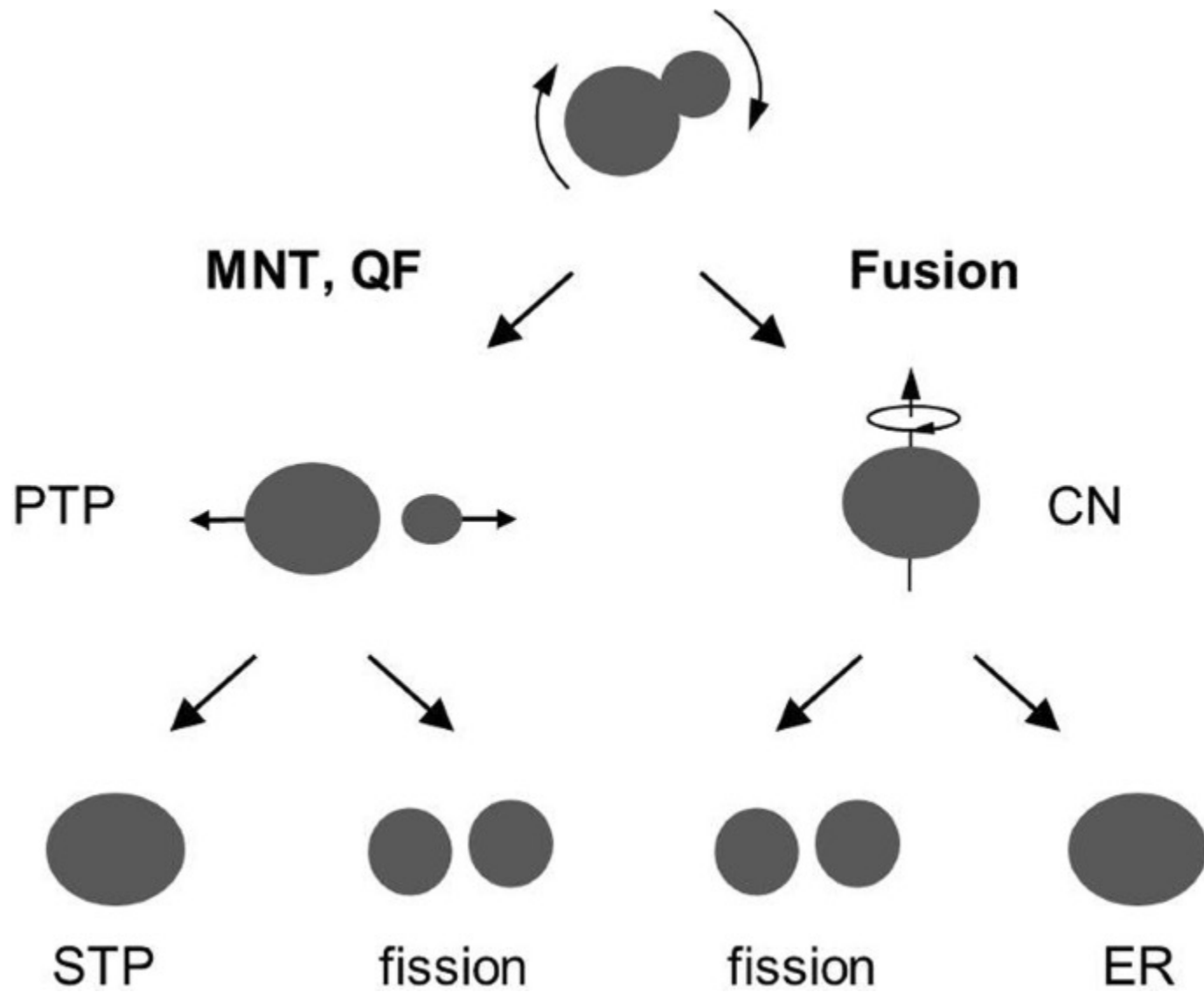
⁵Complutense University of Madrid, Spain



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The NEXT setup

