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## Exploring the Reaction $^{64}\text{Ni} + ^{238}\text{U}$ and the Measurement of Isomeric State Lifetimes of Target-Like Transfer Products

Multi-nucleon transfer (MNT) reactions are a promising method for producing neutron-rich heavy exotic nuclei. Many facilities around the world are studying this process to better understand the reaction mechanisms involved, as well as the competing mechanisms using specific projectile/target combinations [1].

The gas-filled recoil separator RITU [2] at the Jyväskylä Accelerator Laboratory can be used to study a fraction of transfer products emitted close to zero degrees from the beam. By combining RITU with the JUROGAM [3] detector array, transfer products can be identified by their prompt  $\gamma$ -ray emissions at the target position. Furthermore, these  $\gamma$  emissions can be correlated with recoil detection in the focal plane of RITU. This setup provides direct insight into the reaction mechanisms, allowing the study of nuclear structure, reaction kinematics and the determination of differential cross sections.

In this contribution, I will present studies of the reaction  $^{64}\text{Ni} + ^{238}\text{U}$ , performed at energies near the Coulomb barrier. By employing several correlation methods, we identified both quasifission and MNT products. Quasifission fragments were characterized using recoil-gated  $\alpha - \alpha$  correlations, while  $\gamma - \gamma - \gamma$  analysis enabled the detection of target-like nuclei. Additionally, for the first time, the lifetimes of isomeric states of MNT products, which are close to the mass and charge of the uranium target, were measured using conversion electron- $\gamma$  correlations.

### References

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