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# Trap System for Measuring Neutron Capture Cross Section of Short-lived Isotopes

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Neutron-capture cross-sections of radioactive neutron-rich isotopes have a wide impact on nuclear reactions and nuclear structure. They also impact nuclear astrophysics studies. Measurement of these cross-sections is currently considered impossible due to the instability of the targets and projectile.

We propose a method to overcome this limitation. We plan to stop and thermalise fission fragments in a cryogenic stopping cell. These fragments will then form a cooled low-energy beam transported into an RF trap system (coined 'NG-Trap' [1]). An intense neutron beam will consequently irradiate this trapped 'cloud target'. The reacted ions will be mass-selected, identified and counted using a multiple-reflection time-of-flight mass-spectrometer (MR-TOF-MS), thus extracting (n,γ) cross-sections.

This talk will present a triple-RFQ system [2] currently operating at Tel-Aviv University to research and develop the cloud target concept. This system is the first step in designing the NG-Trap system that will be installed at the Soreq Applied Research Accelerator Facility (SARAF) [3], currently under construction in Yavne, Israel.

[1] T. Dickel *et al.*, EPJ Web of Conferences 260, 11021 (2022)
[2] E. Haettner *et al.*, Nucl. Instr. Meth. A 880, 138 (2018)
[3] I. Mardor *et al.*, Eur. Phys. Jour. A 54: 91 (2018)

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