



Status report of the JYFL-ACCLAB in-flight separators MARA and RITU

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The Nuclear Spectroscopy Group (NSG) at JYFL-ACCLAB is employing two complementary in-flight separators in their spectroscopic studies. Recoil Ion Transport Unit (RITU) [1] is a gas-filled recoil separator and has been in operation for almost 30 years. Mass Analyzing Recoil Apparatus (MARA) [2], is a vacuum-mode double focusing mass separator, has been in use for about five years. As said separators are complementary and allow us to perform spectroscopic studies at and beyond the proton-drip line and in the Very Heavy Element (VHE) region starting from mass $A=40$ onward. RITU is ongoing a major upgrade where the focal plane system is updated. Detector systems, used at MARA, are composed of particle and gamma-ray arrays for the prompt spectroscopy at the target position and array of silicon detectors combined by germanium detectors for the delayed spectroscopy at the focal plane. Status report and some recent experimental highlights will be presented.

References

- [1] J. Sarén, J. Uusitalo, M. Leino, and J. Sorri, Nucl. Instr. Meth. Phys. Res. A **654**, 508 (2011).
- [2] J. Uusitalo, J. Sarén, J. Partanen, and J. Hilton, Acta Physica Polonica B **50**, 319 (2019).