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# Neutron-induced charged particle reaction studies in nuclear astrophysics with a Micromegas based gaseous detector

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Neutron-induced charged particle reactions ( $n, p$ ) and ( $n, \alpha$ ), especially on unstable proton-rich isotopes, play an important role in understanding explosive astrophysical scenarios and interpreting their remnants. In a recent publication [1], a novel approach is described to study experimental cross-sections of ( $n, p$ ) and ( $n, \alpha$ ) reactions at explosive stellar temperatures for various nuclei for which experimental data is poor or even non-existent. Currently, we are pursuing the first phase of the project as described in [1, 2], where a Micromegas based gaseous detector for the detection of charged particles for our neutron-induced charged particle reaction studies is being developed. The simulation study of the experimental set-up and testing of the detector and its performance will be discussed in detail, and the astrophysics implications of various reactions being considered for our detailed investigation will be discussed.

References:

[1] M. Friedman; Eur. Phys. J. A 56 (5) (2020)1-7.

[2] C. Yadav, M. Friedman; EPJ Web Conf., 260 (2022) 11048.

## Field of work

**Authors:** Dr YADAV, Chandrabhan (Racah Institute of Physics, The Hebrew University of Jerusalem, Israel); Dr FRIEDMAN, Moshe (Racah Institute of Physics, The Hebrew University of Jerusalem, 91904 Jerusalem, Israel); Mr GREEN, Akiva (Racah Institute of Physics, The Hebrew University of Jerusalem, Israel)

**Presenter:** Dr YADAV, Chandrabhan (Racah Institute of Physics, The Hebrew University of Jerusalem, Israel)

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