

Upgrade of the ELISA setup at the GELINA facility for neutron scattering experiments from 500 keV to 8 MeV

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ELISA (Elastic and Inelastic Scattering Array) is a unique experimental setup in Europe, located at the GELINA (Geel Electron Linear Accelerator) facility of the EC-JRC (European Commission - Joint Research Centre), in Geel, Belgium. The setup has been developed for measuring neutron scattering differential cross sections in time-of-flight (ToF) experiments [1, 2].

The original ELISA spectrometer consists of 32 organic liquid scintillators for the detection of the scattered neutrons, from which half of the detectors have EJ301 (NE-213 equivalent) as scintillation liquid, while the rest have EJ315 (C₆D₆). A ²³⁵U fission chamber is used for the measurement of the incoming neutron flux. As of recently, an additional arm with eight ⁶Li-glass detectors has been added, in an effort to expand the low-energy neutron detection limit below 1 MeV.

To test and validate the normal operation of the new components of the ELISA setup, new measurements with a natural carbon target are being performed. The performance of the ⁶Li-glass detectors with respect to gamma and neutron detection will be presented, together with a first estimation of the upgrade.

References:

[1] E. Pirovano, Ph.D. thesis “Neutron scattering cross section measurements with a new scintillator array”, Ghent University, Faculty of Sciences, Ghent, Belgium (2017).

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[2] G. Gkatis, E. Pirovano, M. Diakaki, G. Noguere, M. Nyman, A. Oprea, C. Paradela, & A. Plompen, “The ELISA spectrometer at the JRC-Geel: development, achievements and future plans”, *HNPS Advances in Nuclear Physics*, 30, 11–18 (2024).

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