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## Preparation for future photoneutron experiments at ELI-NP

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The large scale facility Extreme Light Infrastructure - Nuclear Physics (ELI-NP) [1], currently under development, is the one of the three pillars of the Extreme Light Infrastructure Pan-European initiative which is dedicated to nuclear physics with extreme electromagnetic fields. A high power laser system and a very brilliant gamma beam are the main research equipment at the core of ELI-NP. The gamma beam system (GBS) will produce through laser Compton scattering highly polarized ( $> 99\%$ ), energy tunable  $\gamma$ -ray beams with spectral density of  $10^4$  photons/s/eV, ranging from 200 keV to 19.5 MeV and with a bandwidth better than 0.5%. Using the brilliant GBS at ELI-NP, we propose to investigate the excitation, and particle and gamma decay of Giant Resonances. We plan to develop a multipurpose neutron and gamma radiation detection setup consisting in a flexible array of large volume scintillator detectors and liquid scintillation neutron detectors. We present here the results of Geant4 simulations of this array and also the challenges raised by the gamma beam time structure.

[1] N.V. Zamfir, EPJ Web of Conf. 66, 11043 (2014).

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