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GROOT: A novel Geant4 and ROOT Monte Carlo tool for nuclear physics

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A very brilliant gamma beam system with pencil-size beamspot will be installed at the Extreme Light Infrastructure - Nuclear Physics (ELI-NP), which is one of the pillars of the ELI Project. Monte Carlo simulations are crucial for the proper implementation of the instruments that will be used for experiments and for external users who come to perform experiments at the facility. For this reasons, we developed GROOT, an efficient Monte Carlo software based on Geant4, integrating a n-body event generator of ROOT libraries and a Qt interface in order to provide a fast, reliable and user-friendly tool to be used in nuclear physics experiments, with a particular focus on the study of photo-nuclear reactions of astrophysical interest with silicon detectors. In this talk, a brief overview of ELI-NP facility and part of its research program is given, the advantages of GROOT are shown and the results of the simulations performed in order to evaluate the effects of the electromagnetic background, the energy and angular straggling of the emitted particles and the detector resolution on some selected physics cases are discussed.

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