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Photonuclear spectroscopy with the ELIAD E array at ELI-NP: Status and perspectives

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The Extreme Light Infrastructure - Nuclear Physics in Bucharest-Magurele, Romania, is a major European undertaking with the aim of constructing a facility that can produce the world's highest intensity laser beams as well as unique high-brilliance, narrow-bandwidth gamma-ray beams using laser-based inverse Compton scattering.

One of the main instruments being constructed for the nuclear physics and applications with high-brilliance gamma-beams research activity is the ELIAD E detector array of eight highly segmented HPGe clover detectors and large-volume LaBr₃ detectors, to be mainly used together with the gamma-beam system. Using the nuclear resonance fluorescence technique this setup will provide us with access to several nuclear observables like spins, parities, level widths, and branching ratios in the decay. From these observables we expect to draw conclusions about, for example, nuclear dipole response, properties of pygmy resonance and collective scissors mode excitations, parity violation in nuclear excitations, and matrix elements for neutrinoless double-beta decay, among other topics.

The uniqueness of the environment in which ELIAD E will operate presents several challenges in the design and construction of the array. In this contribution we will present some of these challenges, the current status of implementation, and how these challenges are overcome. We will also present perspectives of the unique opportunities that the characteristics of the beam-lines of ELI-NP can provide and an outlook of the day-one experiments that we will be able to perform.

Selected session

Accelerators and Instrumentation
Nuclear Structure, Spectroscopy, and Dynamics

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