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ERL for Photonuclear Reactions

The electromagnetic interaction of atomic nuclei with photons is a well-understood process that provides model-independent access to their properties. Consequently, photonuclear-reaction studies below and above the particle separation threshold have been a driving force in the study of the nuclear force for decades. Around the turn of the century, the field experienced a renaissance with the availability of intense, quasi-monochromatic, polarized photon sources in the MeV energy range based on the laser-Compton backscattering (LCB) process. Next-generation LCB facilities based on Energy Recovery Linacs (ERLs) have the potential to greatly enhance the reach of fundamental nuclear physics research. In addition, they are an important step towards technological applications of photonuclear processes.

This contribution will introduce the important reaction mechanisms of photons with atomic nuclei, in particular nuclear resonance fluorescence [1]. After discussing the advantages and disadvantages of contemporary photon sources, the potential of ERL-based facilities will be discussed based on current research efforts.

[1] A. Zilges *et al.*, Prog. Part. Nucl. Phys. **122**, 103903 (2019)

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