

# The PANDORA Project: Investigating Photonuclear Reactions in Light Nuclei.

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The PANDORA (Photo-Absorption of Nuclei and Decay Observation for Reactions in Astrophysics) project is dedicated to both experimental and theoretical analysis of photo-nuclear reactions involving light nuclei with a mass below  $A = 60$ . This research is particularly significant in the context of ultra-high-energy cosmic ray investigations, where the primary mode of energy attenuation is determined by the electromagnetic interaction of the nucleus with the cosmic microwave background through the isovector giant dipole resonance (IVGDR).

Currently, propagation calculations and reaction models face challenges due to a lack of reliable experimental data sets for crucial nuclei. By utilizing virtual photon experiments conducted at iThemba LABS and RCNP, as well as real photon experiments carried out at ELI-NP, it becomes feasible to extract information such as the cross section associated with the isovector giant dipole, E1 strength and the branching ratios for particle decay for light nuclei. The first experiment of the PANDORA project that was performed at RCNP at the end of 2023 and the preliminary data analysis of  $^{12}\text{C}$  will be presented. The Grand Raiden at RCNP spectrometer was used in conjunction with SAKRA, a backward angle silicon array for charged particle detection, and SCYLLA, a LaBr<sub>3</sub> array.

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