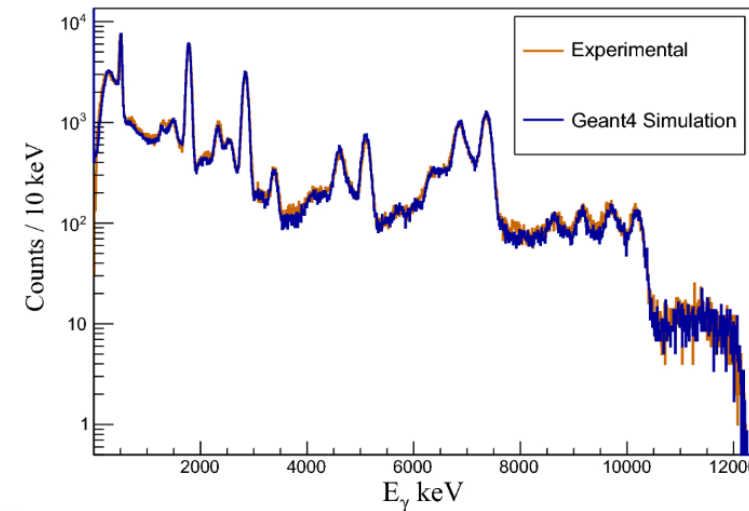
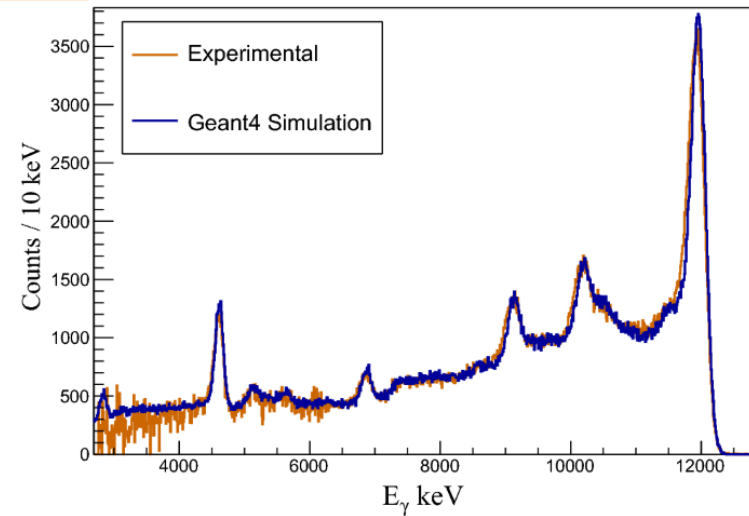


Commissioning of the 4π γ -summing array HECTOR at CASPAR: measurements of $^{27}\text{Al}(p,\gamma)^{28}\text{Si}$ resonances 4850 feet underground



The High Efficiency Total absorption spectrometeR (HECTOR) is a 4π γ -summing detector designed to measure capture cross sections. Here, we present the commissioning of HECTOR at the Compact Accelerator System for Performing Astrophysical Research (CASPAR) laboratory, which is located at the Sandford Underground Research Facility 4850 feet underground. With the underground environment drastically improving the signal-to-noise ratio of the detector, it is estimated HECTOR will be able to push cross-section measurements below a nanobarn. Details of the experimental setup are discussed along with the analysis of several resonance strengths measured for the $^{27}\text{Al}(p,\gamma)^{28}\text{Si}$ reaction between the lab energies 0.2–1.0 MeV. The measurements are in excellent agreement with those found in the literature.



E_p	This Work (<i>l.s.</i>)	This Work (<i>stat</i>)	NACRE [22]
keV	$\omega\gamma$ eV		
292.6	$2.65(17) \times 10^{-4}$	$2.73_{0.22}^{0.29} \times 10^{-4}$	$3.8(7) \times 10^{-4}$
405.3	$9.76(51) \times 10^{-3}$	$10.3_{0.6}^{0.7} \times 10^{-3}$	$9.0(10) \times 10^{-3}$
632.2	0.266(13)	0.269(14)	0.266(14)
887.8	$1.22(7) \times 10^{-2}$	$1.24_{0.15}^{0.19} \times 10^{-2}$	$1.5(2) \times 10^{-2}$
991.9	1.94(10)	1.93(10)	1.9(1)