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Characterisation of Silicon Photomultipliers for Neuroimaging: KRANOS group

Wednesday 10 September 2025 10:10 (20 minutes)

This presentation aims to provide an outline of a summer student research project in the K-40 Radiation for Advanced Neuroimaging Of Strokes (KRANOS) group. The collaboration is centred around research and development of the detection system which will use Silicon Photomultipliers to identify potassium-40 concentrations in the brain. After indirect electron capture, K-40 decays into Ar-40 emitting a 1.4MeV photon which is detected by the SiPM. Using a function generator, a low intensity and narrow pulsed LED source was incident upon the SiPM, allowing for measurement of the gain in each of the 64 readout channels. The linear relation between reverse bias and gain was used to tune each channel for a universal gain across the SiPM. Measurement of gain was repeated using a scanning TCT localised on two readout channels. A sodium-iodide scintillator was used to convert the gamma rays produced by the Caesium-137 into multiple lower energy photons to be absorbed by the SiPM –increasing their absorption coefficients and implementing a form of energy identification. Caesium is used to provide a high statistics gamma decay source to test the set up in the project' s short time frame.

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