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Characterisation of a CdTe detector for medical imaging applications

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A number of portable gamma cameras for medical imaging use CdTe based detectors. These can offer much better spectral resolution than scintillator based devices.

A CdTe pixelated detector has been coupled to a single photon counting, spectroscopic, readout ASIC (Application Specific Integrated Circuit) that has been developed at the Rutherford Appleton Laboratory for use with small pixel CdTe and CdZnTe detectors in the energy range 10–600 keV. The CdTe detector was 1mm thick with an array of 80 x 80 pixels on a 250 microns pitch with a wide 200 micron guard ring running around the outside of the array.

Characterisation of the device was carried out following a new protocol developed for accessing small field of view (SFOV) gamma cameras for medical applications. These protocols are based on the NEMA standards but tailored to test the higher spatial and spectral resolution found in current SFOV systems and includes measurement of the spatial resolution, uniformity, sensitivity and energy resolution for a number of radioisotopes used in medical imaging e.g. ^{99m}Tc .

The energy resolution at 140.5keV was measured to be 1.25keV using a 2MBq of a ^{99m}Tc solution. Details of the detector's performance and images of phantoms will be presented.

Overall the characterisation of the CdTe system indicates that it could be used in a number of medical imaging applications.

Author: Prof. LEES, John (University of Leicester)

Co-authors: Dr BUGBY, Sarah (University of Leicester); Ms JAMBI, Layal (University of Leicester); WILSON, Matthew (STFC)

Presenter: Prof. LEES, John (University of Leicester)

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