

# ENERGY CALIBRATION OF THE MEDIPIX-2 QUAD MXR DETECTOR

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## Introduction:

The Medipix-2 Quad MXR detector is a recent version of the Medipix hybrid silicon pixel detector, which was developed at CERN. It combines four Medipix-2 chips with one common sensor chip. The photon processing x-ray detector will be incorporated into the Medipix All Resolution System (MARS) scanner, a 3D spectroscopic imaging system being developed by a collaboration of researchers from the University of Canterbury and the Canterbury District Health Board. This paper reports on a method developed to carry out an energy calibration for the Quad MXR detector.

## Methods:

The spectroscopic output from the Quad detector requires an energy calibration. The detector has an integrated 10-bit DAC giving an output linear with energy. To calibrate the detector a minimum of two energy points are required; a third point is desirable to confirm the linear response and to improve the accuracy of calibration. For the Quad calibration the DAC output was related to three photon energies. Fluorescence photons from molybdenum (17.5 keV) and gadolinium (43.0 keV) foils generated by x-rays from a micro focus x-ray tube (75 kVp operated at 75  $\mu$ A continuously) and  $\gamma$ -ray emissions from a <sup>241</sup>Am source (59.5 keV) were used. A MATLAB curve fitting toolbox was utilised to identify the peak positions in the measured spectra.

## Conclusions:

The energy calibration was successful, however a number of technical issues remain to be worked through before it can be used on a routine basis. The calibration results will be presented and improvements to the calibration process discussed.