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Imaging with pixellated CdZnTe detectors for use in a Portable Gamma-Ray Spectrometer (PorGamrayS)

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The PorGamRayS project is developing a proof of principle Portable Gamma Ray Spectrometer to perform Compton imaging in the energy range from 60keV to 2.0MeV. This novel detection system will be used for the remote imaging of the radiation field in a wide range of industrial and environmental applications. It will be constructed from a stack of room temperature semiconductors that will consist of two scatter detectors and five absorber detectors. The five absorbers will be constructed from Cadmium Zinc Telluride (CdZnTe). A series of scans with a 1mm collimated beam of 122keV gamma-rays, from a 0.2GBq 57Co source, has been performed on a selection of these detectors. This has enabled their position dependent response to be investigated. Each detector is bonded to a daughter board that also incorporates the read out electronics consisting of a multi-channel Application Specific Integrated Circuit (ASIC). Two ASICs have been tested for the project and their performances have been assessed. Three detectors have been arranged in a Compton camera configuration and a variety of sources have been imaged. The results from the detector scans, ASIC tests and source reconstructions will be presented.

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