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Characterisation and image correction of Hamamatsu C9730DK-10 flat panel X-ray imaging detector

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CMOS flat panels are becoming standard equipment of X-ray micro-imaging laboratories. It is a mature technology that provides very good spatial resolution, dynamic range and large sensitive area.
An example of such detector is the Hamamatsu C9730DK-10 flat panel. It comprises of a CsI:Tl scintillator directly deposited on the two-dimensional photodiode array (pixel size of 50 x 50 µm, total sensitive area 52.8 x 52.8 mm). The charge accumulated in each pixel is transferred to amplifiers and converted to a voltage signal. The analogue signal is subsequently digitized by a 14-bit analogue-to-digital converter and sent to PC via USB interface.
The modulation transfer function, linearity, dynamic range and signal-to-noise ratio were measured and compared with manufacturer's specifications where applicable.
The signal-to-thickness calibration is an image correction method that replaces the standard flat field correction. It was originally developed for the single photon counting detectors Medipix. The signal-to-thickness calibration method was implemented in our in-house software platform for use with the flat panel. Performance of this correction method and a set of sample images corrected by the signal-to-thickness calibration will be presented.

Primary author: Dr UHER, Josef (CSIRO PSE)

Co-author: Dr TICKNER, James (CSIRO PSE)

Presenter: Dr UHER, Josef (CSIRO PSE)

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