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## **Application of MPX3 camera with monolithic sensor for phase contrast imaging and computed tomography**

New WidePIX camera assembled from 2x5 Medipix 3 chips is equipped with common monolithic 500 um thick silicon sensor. This monolithic sensor ensures uniform response of the camera thanks to the homogeneous electric field, higher possible operation voltage which enables thicker sensor comparing with edgeless chips, which are used for large area detectors assembled from single chips [1]. Besides of good image response, camera allows arbitrary selected energy channel as single photon counting Medipix 3 detector has 2 energy thresholds. Read-out of the camera is realized with two independent read out channels based on USB3 protocol, each one operates subassembly 1x5 chips, therefore maximal frame rate 400 fps is available for the whole camera.

It was already demonstrated in the past that pixelated detector Timepix with one energy threshold may be very useful for high resolution and material sensitive tomographic imaging of the fibre composites [2] (although images were distorted by the edges of the sensors). Concurrently, energy threshold may help to identify delamination thanks to the phase contrast effect occurring on the crack faces [3]. Improvement of the image quality and delamination detectability will be demonstrated on the same carbon fibre sample. Newly, fusion of the X-ray computed tomography reconstruction with 3D shape of the delamination reconstructed from phase contrast images taken from certain number of angles will be presented.

It was also already shown, that 2Hz tomography is possible in laboratory conditions [4], however only single chip detector Timepix was used there. Such fast tomography with higher spatial resolution will be demonstrated as other case study.

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