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Optical & Electrical Characterization of a backthinned CMOS Active Pixel Sensor

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This work will report on the first work on the characterisation of a backthinned Vanilla - a 512x512 (25um squared) active pixel sensor. For some time, it has been predicted that the removal of the supporting substrate section of the sensor to allow detection via direct backside illumination would result in many potential benefits to applications in fields such as particle physics (lower mass) and biomedical science (enhanced UV detection). However, whilst common practice in CCDs, such backthinning techniques have been rarely used on Active Pixel Sensors In this work, on wafer Vanilla sensors were backthinned (by E2V) to within a few microns into the epi-layer. Characterisation of the detectors was carried out through the analysis of Photon Transfer Curves to yield a measurement of full well capacity, noise levels, gain constants and linearity. Spectral characterisation of the sensors was also performed in the Visible and UV regions. A full comparison against non backthinned front illuminated Vanilla sensors is included.

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