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MTF and QE Characterisation of a CMOS Imager for the JUICE JANUS Instrument

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The ESA JUPITER ICy moon Explorer (JUICE) mission hosts the JANUS instrument, a planetary imager for the observation of Jupiter and Jovian moons Ganymede, Europa and Callisto, operating from the year 2030. The JANUS focal plane comprises a 4T 3Mpixel backside-illuminated CMOS Image Sensor (CIS) from Teledyne e2v, which is currently subject to high-energy proton, gamma, electron and heavy-ion radiation damage testing at the Centre for Electronic Imaging.

JANUS is a monochrome imager with 13 optical filters and a spatial resolution varying between 2.4m on Ganymede and 2.4km on Jupiter. The spatial and wavelength characterisation of the imager in the visible spectrum is essential information for determining the available resolution and colour response of the instrument in flight. The design, development and characterisation of an optical test bench for measuring the Quantum Efficiency (QE) and Modulation Transfer Function (MTF) of the CIS115 detector is presented. In addition, a comparison of the beginning of life and end of life performance of the CIS115 is discussed in relation to the projected mission performance.

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