

Hot Pixel Generation and Clock Induced Charge in Te2v CCDs

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Description:

The Centre for Electronic Imaging (CEI) has been involved in studying the nuances of radiation damage in Charge-Coupled Devices (CCDs) for over a decade. Most recently, detailed study of Clock-Induced Charge (CIC) by a CEI PhD student was undertaken on detectors towards the WFIRST Coronagraph (now named the Nancy Grace Roman Space Telescope). Coupled to the generation of CIC, the generation mechanisms and properties of hot pixels has become somewhat of a “hot” topic in recent studies.

In this PhD studentship, the successful candidate would aim to:

- Develop a fundamental understanding of hot pixel generation and anomalies in specific Te2v devices.
- Analyse the impact of hot pixels in flight devices in flight.
- Further develop the understanding of CIC generation in Te2v CCDs.
- Consider possible ways of reducing the generation rate of hot pixels and generation of CIC and ways to mitigate the impact.

By working in collaboration with the CCD manufacturers, Te2v, the student would gain a rounded training and understanding of detector development and research in industry and in academia, with support provided by both academic and industrial supervisors..

This studentship will be hosted by the Centre for Electronic Imaging (CEI) at the Open University. Previous industry-sponsored studentships with the CEI and Te2v related to novel device development have had great and proven success and provided exceptional scientific return, with major impacts on ESA’s Euclid VIS, JUICE JANUS, Athena WFI and SMILE SXI, alongside new device development programmes at Te2v. All have moved directly into employment following completion.

Te2v is a global leader in specialised components and subsystems for innovative solutions in medical, science, aerospace, defence and industrial applications. Based in Chelmsford, UK, Te2v has been trusted to design and deliver CCD and CMOS imaging sensors and sub-systems for over 150 space missions by the world’s largest space agencies, including ESA, NASA and JAXA.

References:

1. Bush, Nathan L. (2018). The Impact of Radiation Damage on Electron Multiplying CCD Technology for the WFIRST Coronagraph. PhD thesis The Open University.

Qualifications required: 2.1 Masters in Physics or related subject.