

High Dynamic Range CMOS Image Sensors

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Description:

This project aims to develop silicon CMOS image sensors with high dynamic range (HDR) for demanding applications in astronomy, spectroscopy and other science applications. HDR sensors are used when the difference in light intensity within a scene or between different operating conditions is very large, for example imaging a dim object next to a bright one, or imaging at night and during the day.

Developing such sensors in CMOS technology is of great interest to the Centre for Electronics Imaging (CEI) at the OU and our industrial partner Teledyne e2v. Recently, the CEI has developed a patent-pending method of achieving HDR using a single exposure and is pursuing the experimental verification of the operating principle. This studentship can make a valuable contribution to the development of the technology for future use in space- and ground-based astronomy.

The work will involve experimental characterisation of devices, semiconductor device simulations, data analysis and development of support electronics. The CEI has significant experience in the design, operation and characterisation of CMOS image sensors, and holds 4 patent applications in the area. CEI's excellent track record in performing sophisticated semiconductor device simulations, and our increasing knowledge in integrated circuit design put these activities on a solid base.

The student will benefit from training in CMOS circuit design and operation from experienced engineers at Teledyne e2v, and is expected to provide input to designs of new image sensors, considering the obtained experimental and simulation results. The outcomes of this studentship will be directly applicable to the future space missions the CEI and Teledyne e2v are involved with, and will help develop new sensors for astronomy, Earth observation and Solar system exploration.

Qualifications required: A first class or upper second class MSc degree in physics, electronics engineering or a related discipline.