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## The Malta CMOS pixel detector prototype for the ATLAS Pixel ITK

The ATLAS experiment is planning a major upgrade of its tracking detectors, both strip and pixel, to take full advantage of the High Luminosity LHC. A novel Monolithic Active Pixel Sensor based on 180 nm TowerJazz CMOS imaging technology, dubbed MALTA, has been designed to meet the radiation hardness requirements ( $1.5 \times 10^{15}$  1 MeV neq/cm<sup>2</sup>) of the outer barrel layers of the ITK Pixel detector. MALTA combines low noise (ENC < 20 e<sup>-</sup>) and low power operation (1  $\mu$ W/pixel) with a fast signal response (25 ns bunch crossing) in small pixel size (36.4x36.4  $\mu$ m<sup>2</sup>), with a novel high-speed asynchronous readout architecture to cope with the high hit-rates expected at HL-LHC. Extensive lab testing and characterisation in particle beam tests have been conducted on this design and compared with previous prototypes of the same technology. An overview of the sensor technology and readout architecture are presented along with the preliminary results from laboratory tests, radioactive source tests and beam tests.

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