Detector Modelling Workshop 2021 (DeMo)



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An Automated Algorithm for Persistence Correction in an Operational Environment

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Persistence is the effect whereby a remnant signal from a previous exposure is imprinted on a subsequent image. This effect has long been known to affect HgCdTe near-infrared detectors and, if severe, the persistence artefacts can last several hours or even days, rendering subsequent observations nearly useless. Historically, ESO has addressed persistence by strongly limiting the exposure levels of its detectors and hoping that this limit is never accidentally exceeded. However, in the era of the ELT this simple approach is no longer viable. Using the detector characterisation provided by the ESO Detector Group, we are developing an automated routine that computes a persistence map for each science exposure. With an in-depth understanding of the detector's unique persistence characteristics, our routine maps the accumulated trapped charges and their subsequent decay through the exposure history, prior to any given science image.

The intent is to make each persistence map available from the ESO archive as an associated calibration attached to each science exposure. In this way, we have converted the measurements, and models of individual detector effects to a practical procedure that can significantly reduce the impact of detector effects on science instruments.

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