



Contribution ID: 15 Type: **Poster presentation (90 second oral summary, 90 minute poster session & free presentation times over 3x 40m coffee breaks)**

Propagating Random Telegraph Noise in Las Cumbres Observatory's CMOS data

Tuesday, 12 March 2024 14:30 (1h 30m)

At Las Cumbres Observatory (LCOGTN) we have introduced CMOS-based imagers (QHY600 with Sony IMX455 sensors) as the main cameras in our global network of ten 35-cm telescopes. The uses are for our global education program (Global Sky Partners) and professional astronomy (e.g., TESS planet transit follow-up). The deployment of CMOS detectors in the small telescope network also serves as a pathfinder for a possible future introduction of large-format CMOS cameras to the LCO 1-meter telescope fleet. In this presentation, we report some of the first lessons learned from using CMOS cameras in a production environment.

In particular, we focus on characterizing and treating random telegraph signal (RTS), an additional noise component in CMOS cameras. While RTS can be neglected in very high S/N situations, such as in planet transits, it might bias photometry in the low S/N case. Traditional CCD data reduction has no established data processing paradigms for this additional noise component. At LCOGTN we have developed procedures to model RTS and then seed and propagate a simplified per-pixel noise model in our data processing pipeline BANZAI. We are exploring more advanced mitigation studies, such as using modeled multi-modal RTS distributions as a prior for maximum likelihood fitting when stacking images, which can converge significantly faster than simple averaging.

contribution subject matter

CMOS sensors

Keywords for your contribution subject matter (this will assist SOC in accurately characterizing your contribution)

CMOS
Random Telegraph Noise

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Track Classification: Major ISPA Workshop Tracks: Software/Algorithms for Precision Astronomy