

Calibration and Standardization of Large Surveys and Missions in Astronomy and Astrophysics



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aTmcam: A Simple Atmosphere Transmission Monitoring Camera For Sub One Percent Photometric Precision

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Traditional color and airmass corrections can achieve ~1% precision in photometric observing conditions. A major limiting factor is the variability in atmospheric throughput, which changes on timescales of less than a night. We present preliminary results for a system to monitor the throughput of the atmosphere, which should enable photometric precision when coupled to more traditional techniques of less than 1% in photometric conditions. The system, aTmCam, consists of a set of imagers each with a narrow-band filter that monitors the brightness of suitable standard stars. Each narrowband filter is selected to monitor a different aspect of the atmospheric transmission, including the amount of precipitable water, aerosol optical depth, etc. We present performance modeling results and comparison of narrowband photometric measurements with spectroscopic measurements of the atmosphere; we show that the narrowband imaging approach can predict the throughput of the atmosphere to better than ~10% across a broad wavelength range.

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