

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



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## A Path to NIST Calibrated Stars over the Dome of the Sky

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The UNM Measurement Astrophysics group is currently constructing and testing a mobile instrument suite that includes a multi-wavelength backscatter lidar, stellar spectroradiometer and cameras (visible and thermal infrared) that will provide real-time atmospheric transmission metadata in the column of atmosphere through which the supported telescope is observing. The design, operation and calibration of the lidar (the Facility Lidar for Astronomical Measurement of Extinction - FLAME) and spectroradiometer (the Astronomical Extinction SpectroPhotometer - AESoP) are detailed.

The first task of this instrument suite will be to help create a new set of standard stars radiometrically calibrated to NIST standards. Initially this will be done for bright stars across the wavelength range 350nm to 1050nm at 1nm spectral resolution with measurement accuracy better than 1% per spectral resolution element by calibration to NIST silicon detectors.

Because these standard stars will support both ground- and space-based observations, our proposed evolution of calibration begins with suitable bright optical standards and then adds measurements into the infrared. Following optical/infrared calibration of bright stars we plan to calibrate fainter stars, ultimately to  $V \sim 18$ , both in the optical and near infrared.

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