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



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Using GPS to Measure NIR Extinction By Water Vapor

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Absorption by water vapor in Earth's atmosphere is a major impediment to ground-based astronomical measurements in the near infrared (NIR). The problem is exacerbated by the fact that the concentration of water vapor in the troposphere is highly variable, and can change on very short timescales. While differential photometric techniques can partially compensate for this, precise NIR photometry of objects with highly-structured spectral energy distributions remains a challenge. Detailed modeling of water vapor absorption is also crucial for high-resolution NIR spectroscopy. A Global Positioning System (GPS) receiver can be used to estimate the total zenith water column in real time. I will show that data from a GPS receiver can be used to generate theoretical atmospheric transmission templates that can be useful for correcting astronomical spectra for telluric absorption and also for improving the precision of broad-band NIR differential photometry of cool stars.

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