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Title: NORMAL INCIDENCE SPECTROPHOTOMETER WITH HIGH-DENSITY TRANSMISSION GRATING TECHNOLOGY AND HIGH-EFFICIENCY SILICON PHOTODIODES FOR ABSOLUTE SOLAR EXTREME-ULTRAVIOLET IRRADIANCE MEASUREMENTS

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Abstract: New developments in transmission grating and photodiode technology now make it possible to realize spectrometers in the extreme ultraviolet (EUV) spectral region ( $\lambda < 1000$  angstrom), which are expected to be virtually constant in their diffraction and detector properties. Time-dependent effects associated with reflection gratings are eliminated through the use of free-standing transmission gratings. These gratings together with recently developed and highly stable EUV photodiodes have been utilized to construct a highly stable normal incidence spectrophotometer to monitor the variability and absolute intensity of the solar 304-angstrom line. Owing to its low weight and compactness, such a spectrometer will be a valuable tool for providing absolute solar irradiance throughout the EUV. This novel instrument will also be useful for cross-calibrating other EUV flight instruments and will be flown on a series of Hitchhiker shuttle flights and on SOHO. A preliminary version of this instrument has been fabricated and characterized, and the results are described.

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