IRS2012-303
International Radiation Symposium 2012
Dahlem Cube, Berlin, Germany, 06 – 10 August 2012

A Laser-Driven Light Source (LDLS) as a portable spectral solar UV irradiance calibration source

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Abstract

The total uncertainty of solar UV irradiance measurements, at the earth surface, is mainly due to the large drop of solar radiation in the UV spectral range. Additionally, portable spectroradiometers, meant to be used for in-situ observations need to be calibrated, among the others, for wavelength and spectral irradiance. Spectral irradiance, and wavelength standards normally consist of FEL 1000-watt tungsten and of low pressure discharge lamps (filled with either noble gases or metals), respectively. These standards also show a sensible fall off of their emission in the UV range, thereby the calibration leads to a not negligible error in the measurements. In the present contribution, which is part of the European Metrology Research Project ENV03, *Traceability for surface spectral solar ultraviolet radiation*, we explore the possibility of using a new commercially available Laser-Driven Light Source (LDLS) as compact transfer standard for field applications. This kind of sources generates a broadband spectrum, with high irradiance levels in the spectral range of interest, that is $\lambda \in (280 - 400)$nm, along with high spatial and temporal stability. The possibility of having a stable, long-lived, source with high output in the spectral range of interest for solar UV measurements, can sensibly reduce the contribution of the spectral irradiance calibration to the total uncertainty budget.