

## DEVELOPMENT OF A LUMINANCE STANDARD

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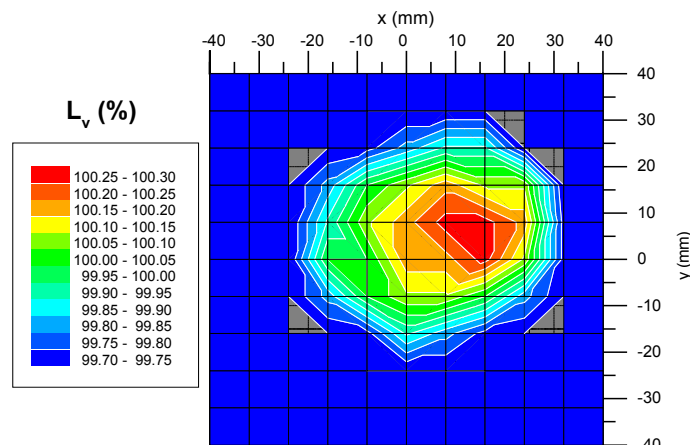
### Abstract

In recent decades, a major aim of the Dept. of Metrology of the IFA (CSIC) has been the development of primary standards in optical Radiometry and Photometry. The realizations of the Absolute Spectroradiometric Scale, the Candela and the Lumen are all results of that work. This communication reports the development of a Luminance Standard.

From a visual point of view, luminance is of the most important photometric magnitude. The surfaces are visible because of their luminance.

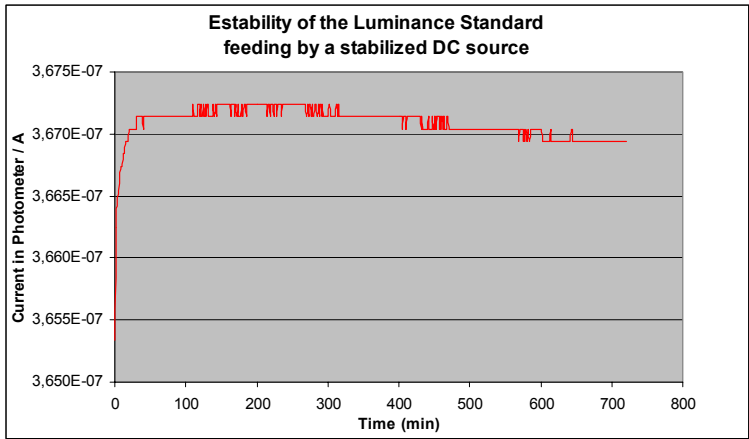
Luminance meters need to be calibrated with respect to a reference scale, the quality of which has a direct impact on the uncertainty of any measurements made. This work describes the planning, construction and calibration of a Luminance Standard, basically a luminous, circular disc with a diameter of 70 mm, backlit with diffuse light whose spectral distribution corresponds to CIE Illuminant A.

On a smaller circle within this disc (diameter 50 mm), the uniform luminance perpendicular to the surface achieved was better than 1% (measured using a fibre optic system with Cartesian movement) (Fig. 1). The luminance at each point complied with Lambert's Law into an angular interval of  $\pm 15^\circ$  with respect to the normal to the surface.



*Fig. 1.- Relative luminance on the surface of Luminance Standard.*

Figure 2 shows the temporal stability of the emitting surface.



*Fig. 2.- Time Stability of the Luminance Standard.  
Measured with the Photometer FOTI along 12  
hours*

The light emitted by the surface of the standard is not polarised.

A FOTI standard photometer was used in a photometric bank to calibrate the luminance of the surface of the standard in  $\text{cd m}^{-2}$ , measuring the illuminance on the photometer produced by the luminous surface at

different distances. The FOTI photometer was previously calibrated against standard luminous intensity lamps.

The luminance of the luminous surface of the luminance standard was measured with a final expanded uncertainty ( $k=2$ ) of  $\pm 0.7\%$ .