

2016 Optical and Radiometry capabilities



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Optical Dosimetry Lab
Centro Nacional de Metrologia (CENAM) Mexico

- **Introduction.**
 - **CENAM / Direction of Optics and Radiometry mission**
 - **Organization chart**
 - **Standards and Calibration service**
- **Recent developments in support of industry**
- **New calibration services**
- **Future work in DOR**

CENAM / DIRECTION OF OPTICS AND RADIOMETRY MISSION

Requerimientos de las normas:

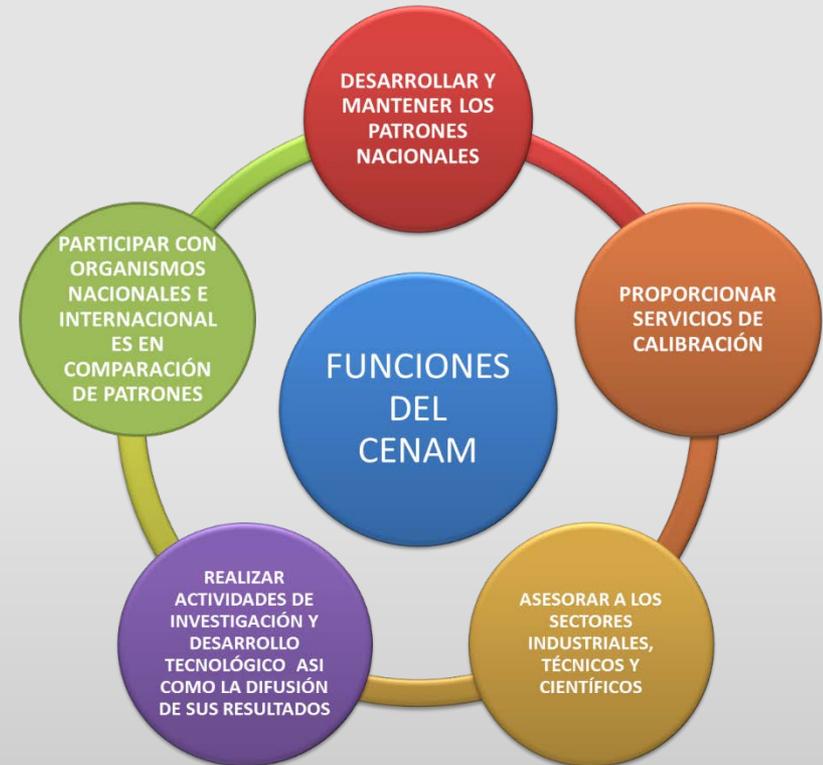
Requirements of the norms:

ISO 9001:2008 (NMX-CC-9001-IMNC-2008)

7.6 Control of monitoring and measuring equipment.

The measurement equipment will be: Los equipos de medición deben:

- Calibrarse o verificarse a intervalos específicos o antes de su uso, contra patrones de medición trazables a patrones nacionales o internacionales.
- Be calibrated or verified at specified intervals, before to use, against measurement patterns traceable to national or international standards
- Protegerse contra ajustes que puedan invalidar el resultado de la medición.
- Protected against adjustments that may invalidate the measurement result.





5 Technical Directions, which feature in conjunction with :

- 120 metrology labs.
- 68 National Standards, established and documented
- More than 100 transfer and working standards
- Advisory and technical assessment of labs in Central and South America

Official Norms in Mexico with CENAM participation

Viernes 22 de junio de 2012

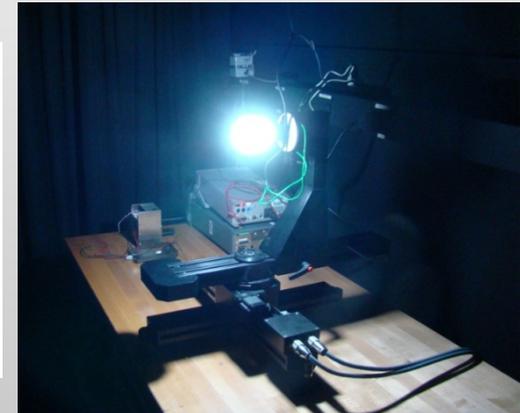
DIARIO OFICIAL

(Primera Sección) 28

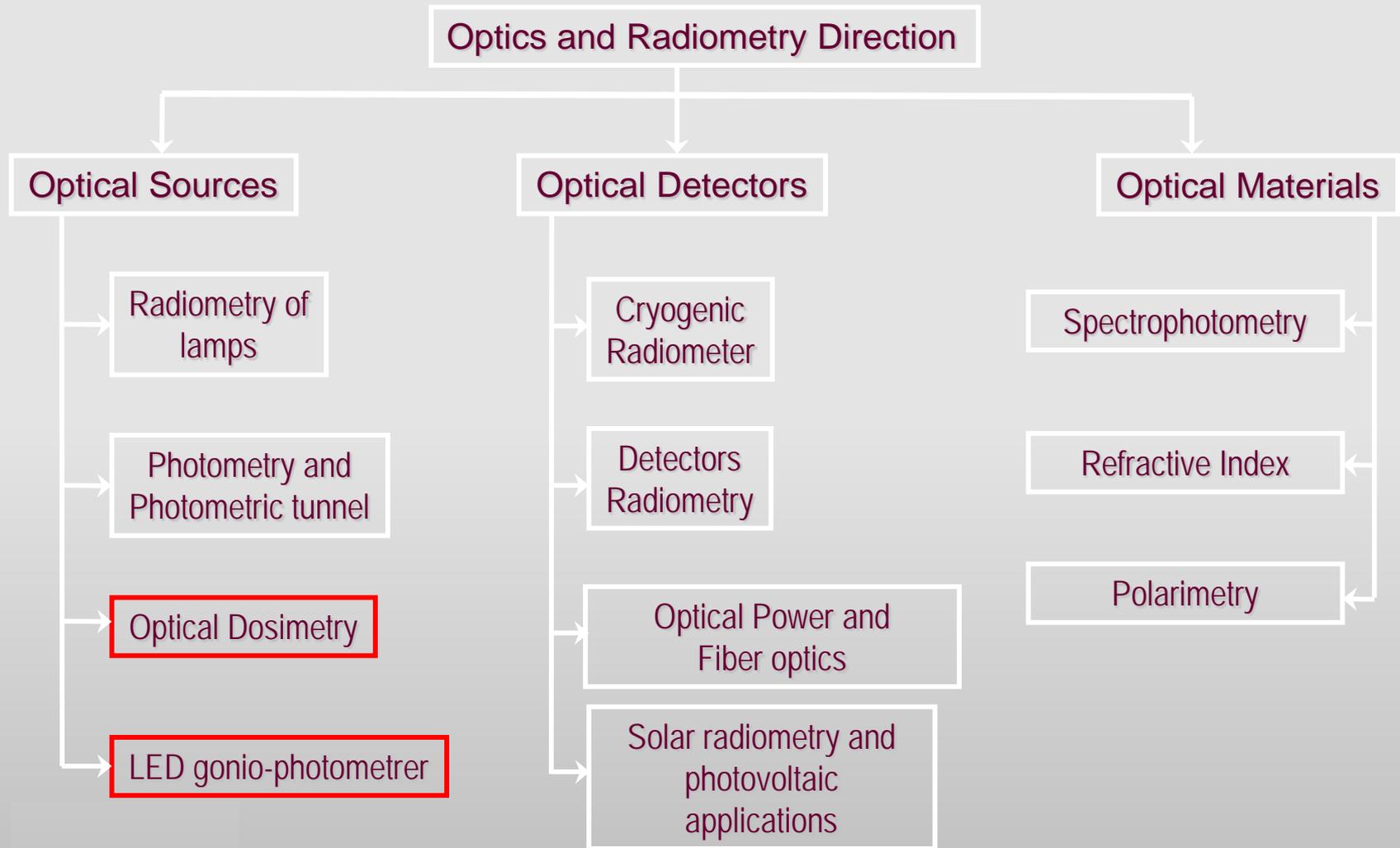
NORMA Oficial Mexicana NOM-030-ENER-2012, Eficacia luminosa de lámparas de diodos emisores de luz (LED) integradas para iluminación general. Límites y métodos de prueba.

Al margen un sello con el Escudo Nacional, que dice: Estados Unidos Mexicanos.- Secretaría de Energía.- Comisión Nacional para el Uso Eficiente de la Energía.- Comité Consultivo Nacional de Normalización para la Preservación y Uso Racional de los Recursos Energéticos (CCNNPURRE).

NORMA OFICIAL MEXICANA NOM-030-ENER-2012, EFICACIA LUMINOSA DE LAMPARAS DE DIODOS EMISORES DE LUZ (LED) INTEGRADAS PARA ILUMINACION GENERAL. LIMITES Y METODOS DE PRUEBA.

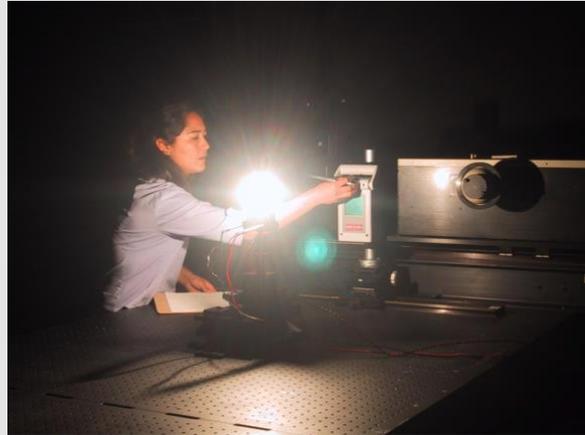
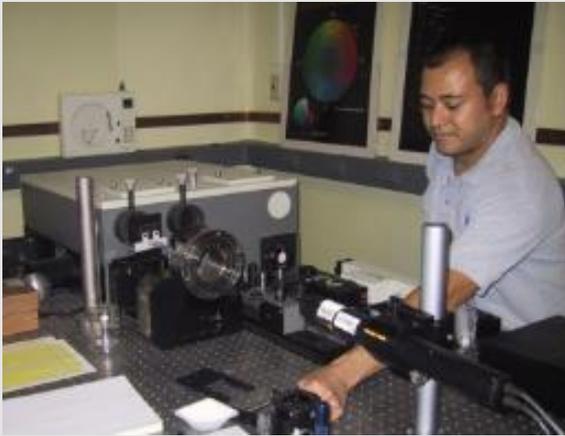


ORGANIZATION CHART



ORGANIZATION CHART

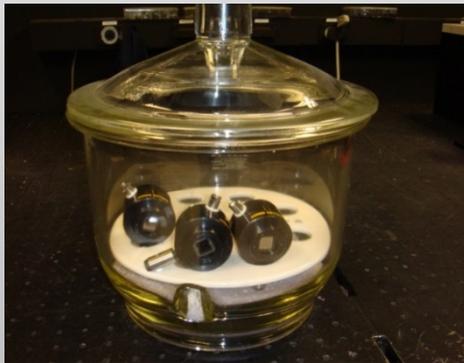
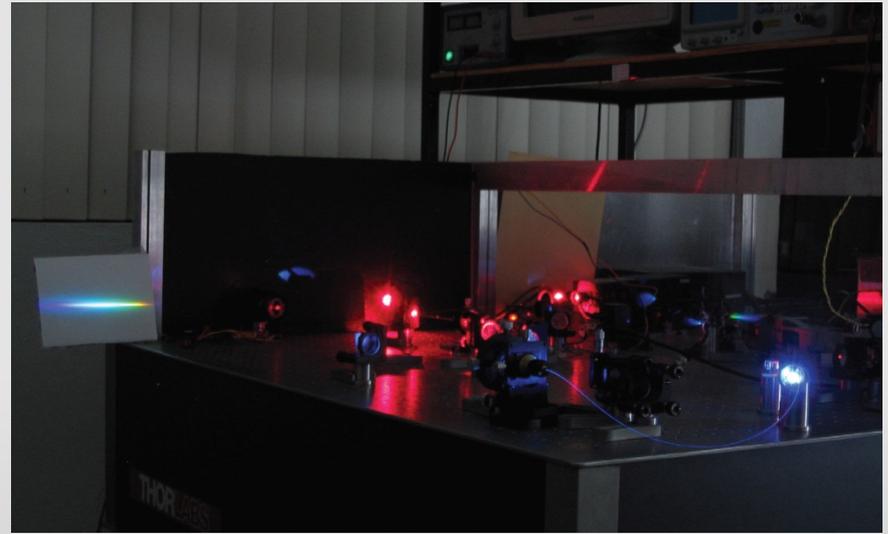
Number of Technical Staff : **13**



STANDARDS AND CALIBRATION SERVICES

Cryogenic Radiometer Lab

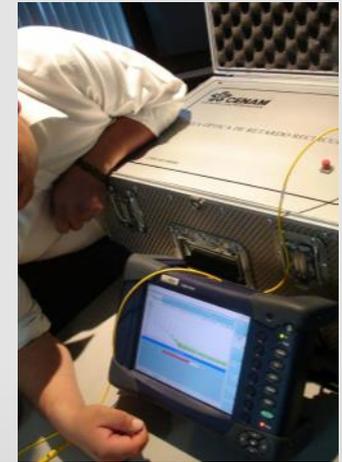
Development and maintenance of the cryogenic radiometer, as the national standard for optical power.



- National standard of Spectral Responsivity
- Calibration of trap detectors
- Calibration of pyroelectric radiometers

Detectors spectroradiometry Lab

- Development and maintenance of the spectroradiometry detectors comparator.
- Calibration of Si detectors and photometric heads.



Optical Power and Fiber Optics Lab

- Development and maintenance of fiber optical systems for the telecommunications industry
- Development and maintenance of national standards for optical length and optical attenuation

Photometry and photometric tunnel

- Development and maintenance of optical systems for luminous intensity, illuminance, luminance, luminous flux and retro-reflectance measurements.
- National standards for candela and lumen.

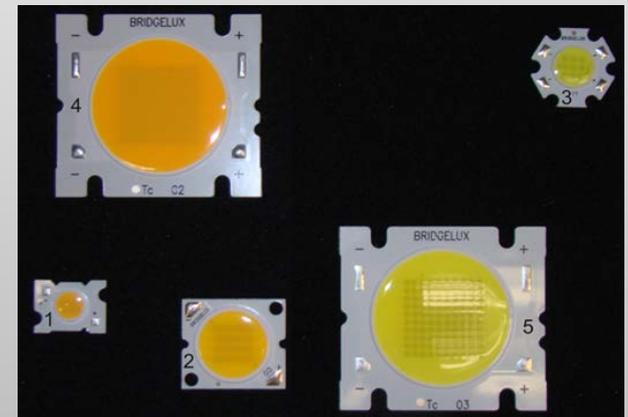
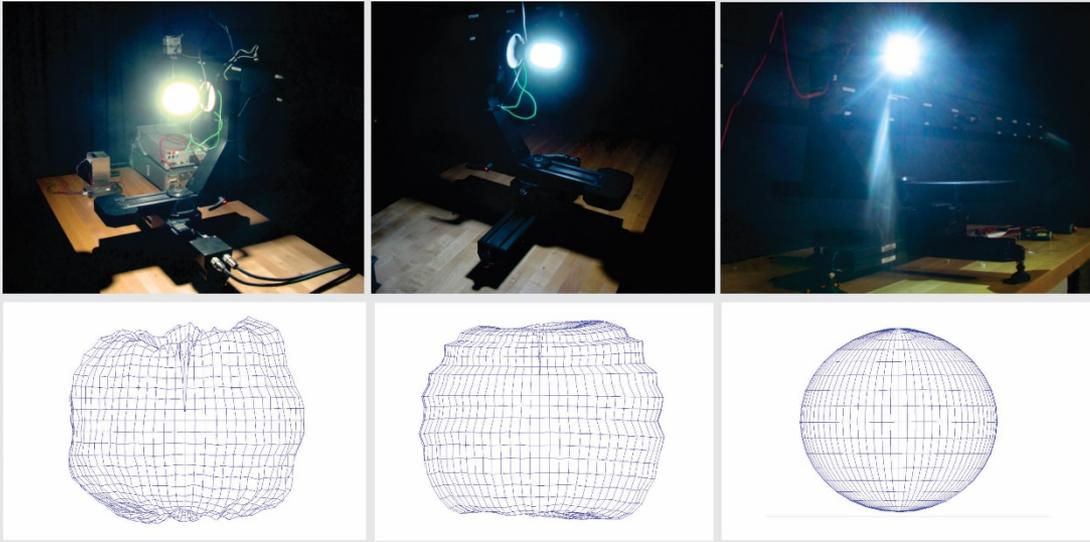


Spectroradiometry of Lamps

- Development and maintenance of radiometric systems for measurement of lamps.
- National standard for spectral irradiance .

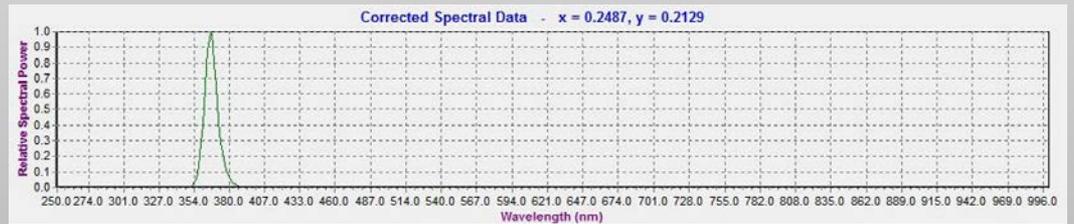
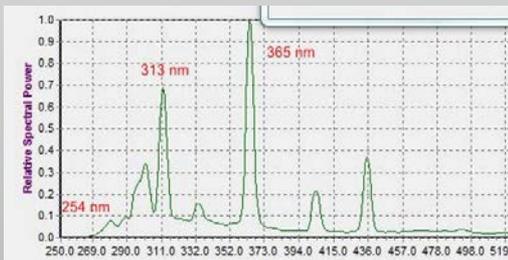
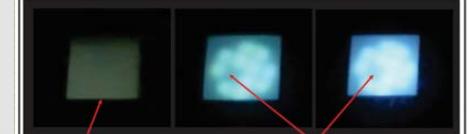
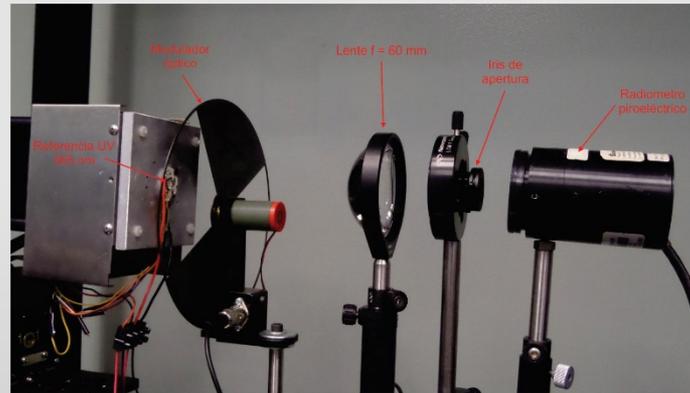
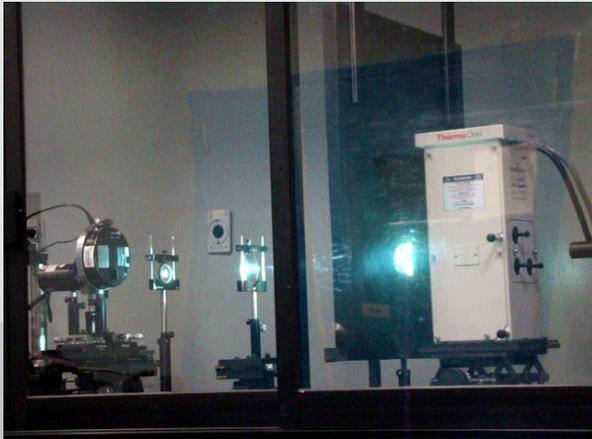
LED Gonio-photometer Lab

- Development and characterization of LED standards
- Measurement of luminous flux distribution, spectral irradiance, correlated color temperature, chromaticity coordinates.



Optical Dosimetry Lab

- Development and maintenance of UV radiometric systems
- National standard for UV doses
- Calibration of UV radiometers and UV dosimeters.



Optical Properties of Materials Labs

- Development and maintenance of systems for measurement of transmittance, absorptance, reflectance, polarimetry, refractive index, color, gloss, opacity.
- Research and production of standard reference materials for optical methods measurements



Calibración de espectrofotómetros



Certificación de filtro de óxido de holmio o de óxido de didimio

Certificación de filtro con densidad óptica neutra



Ensayos de Aptitud sobre la Calibración de espectrofotómetros y de opacímetros

Calibración de colorímetros



Certificación de patrones de color



Medición espectrofotométrica: transmitancia, absorbancia, reflectancia espectrales y magnitudes derivadas

Calibración de refractómetros

Certificación de vidrios en índice de refracción



Calibración de polarímetros



Certificación de materiales de referencia de brillo



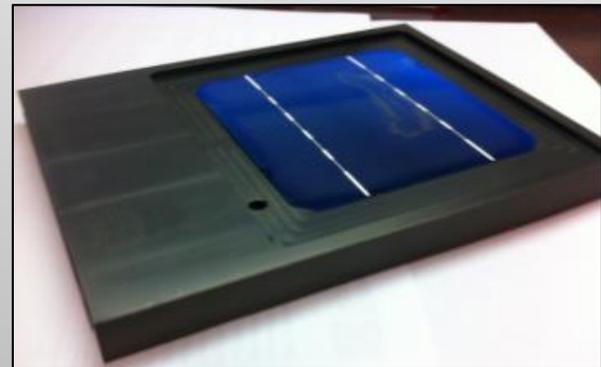
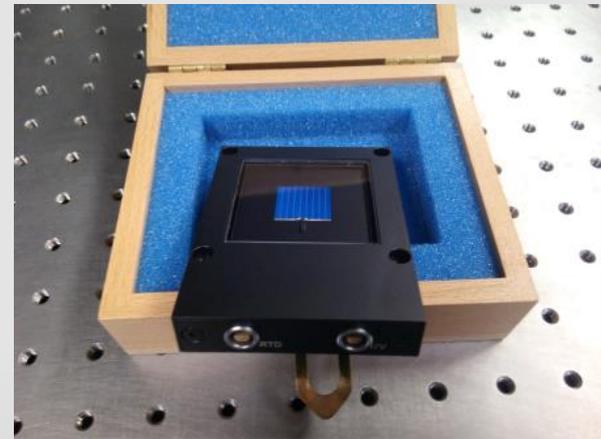
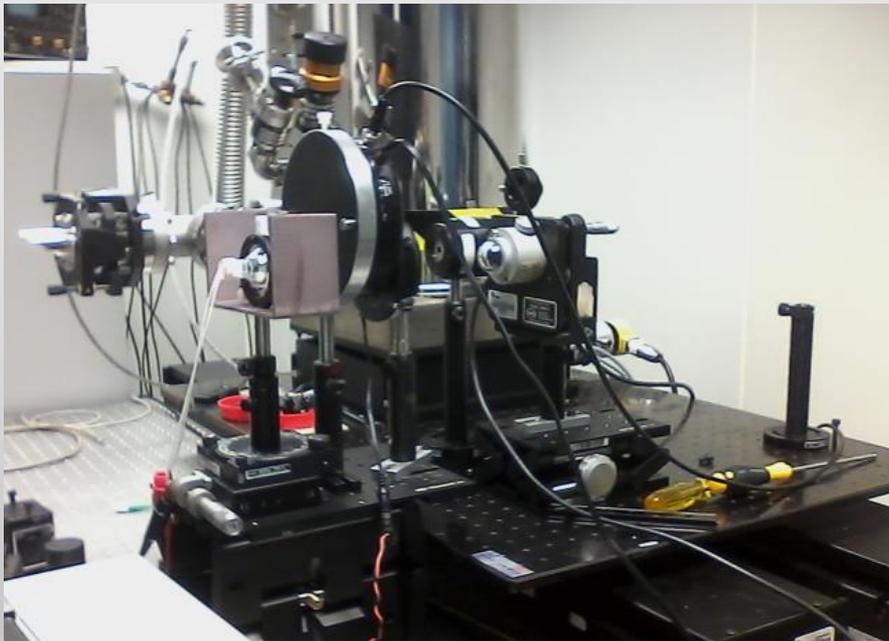
Calibración de brillómetros

Certificación de placas de cuarzo en rotación óptica

RECENT DEVELOPMENTS IN SUPPORT OF INDUSTRY

Solar Radiometry and Photovoltaic Applications Lab

- Development and maintenance of systems for solar irradiance and photovoltaic applications
- Characterization of solar simulators
- Development of reference solar cells



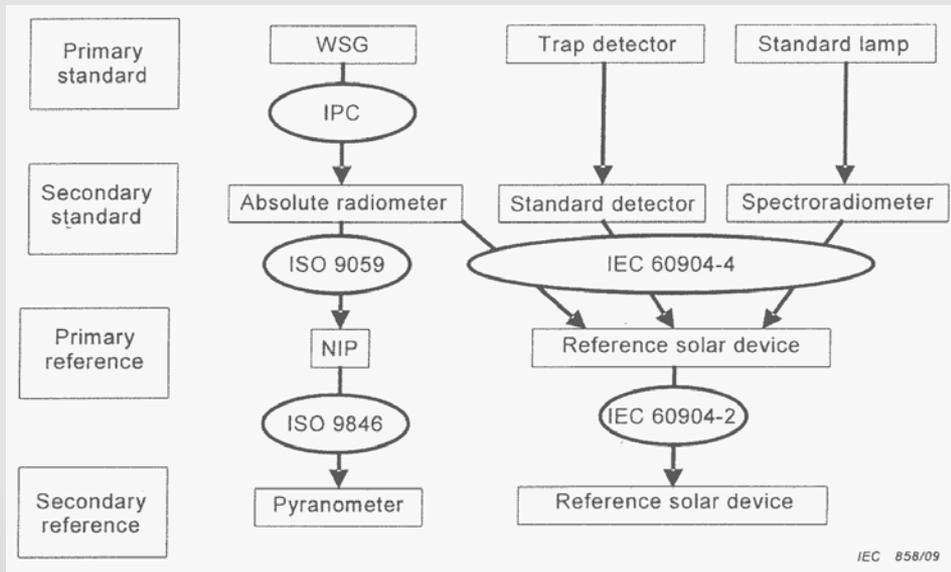
COLLABORATION BETWEEN CENAM AND INTI (ARGENTINA)

Realization of the Spectral Irradiance Scale in the UV Range



NEW CALIBRATION SERVICES

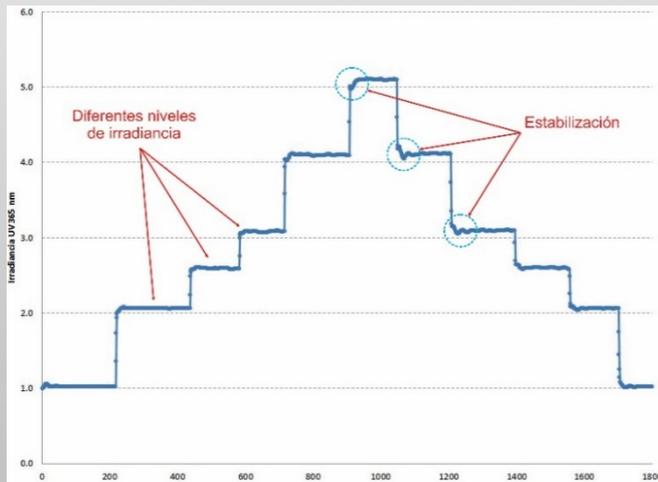
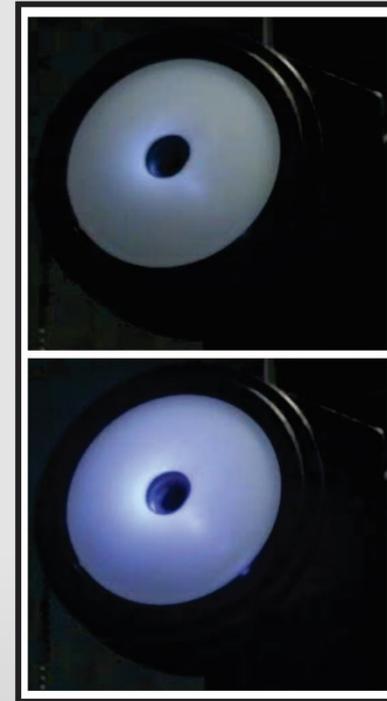
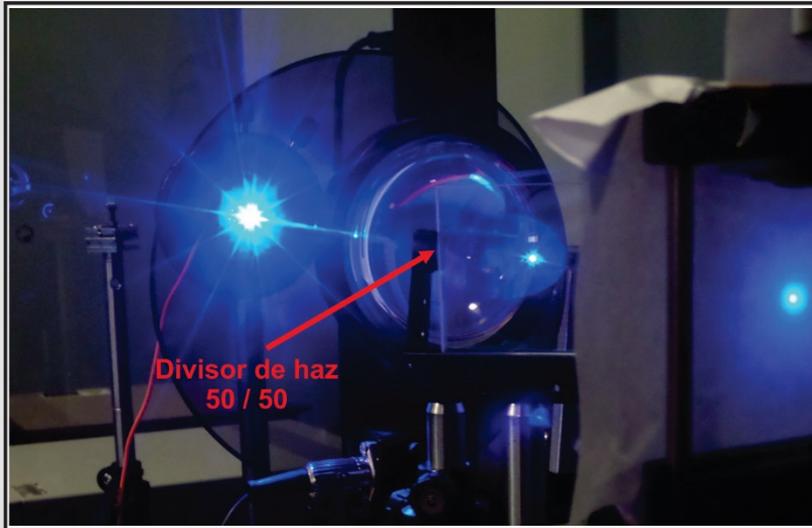
Pyranometer Calibration



Traceability Chain

- Cryogenic Radiometer
- Piroelectric radiometer (ECPR)
- Reference Pyranometer
- Test Pyranometer

UV doses with LED's as reference in 365 nm



Tensión de Salida (V)
 40.86
Corriente de Salida (A)
 0.05230
Salida Keithley

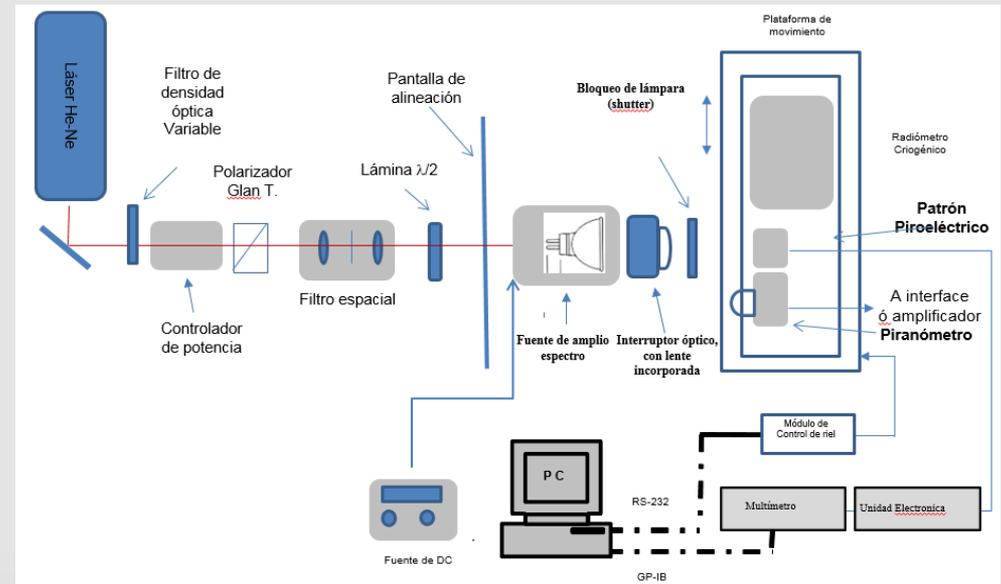
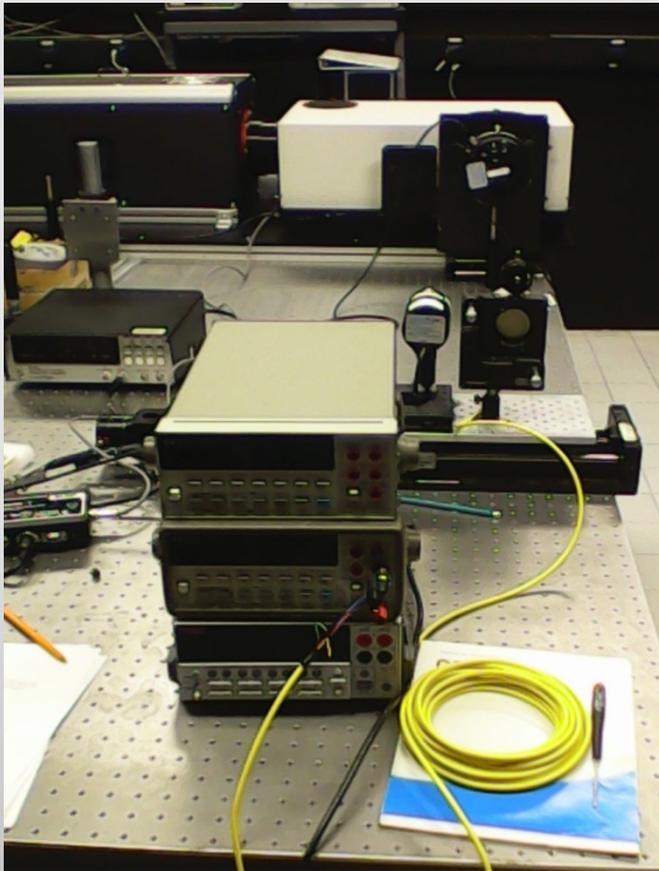
Tension
 2.5 mW 3 mW
 2 mW 4 mW
 1 mW 5 mW ± 1 mW

Corriente
 2.5 mW 3 mW
 2 mW 4 mW
 1 mW 5 mW ± 1 mW

24.988

FUTURE WORK

Solar Simulator Project



International publication of National Standards improvement

Measurement 64 (2015) 89–93

Contents lists available at [ScienceDirect](#)

 **ELSEVIER**

Measurement

journal homepage: www.elsevier.com/locate/measurement

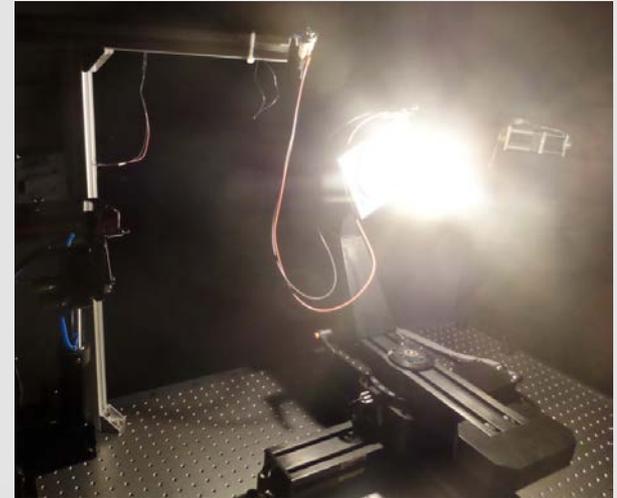
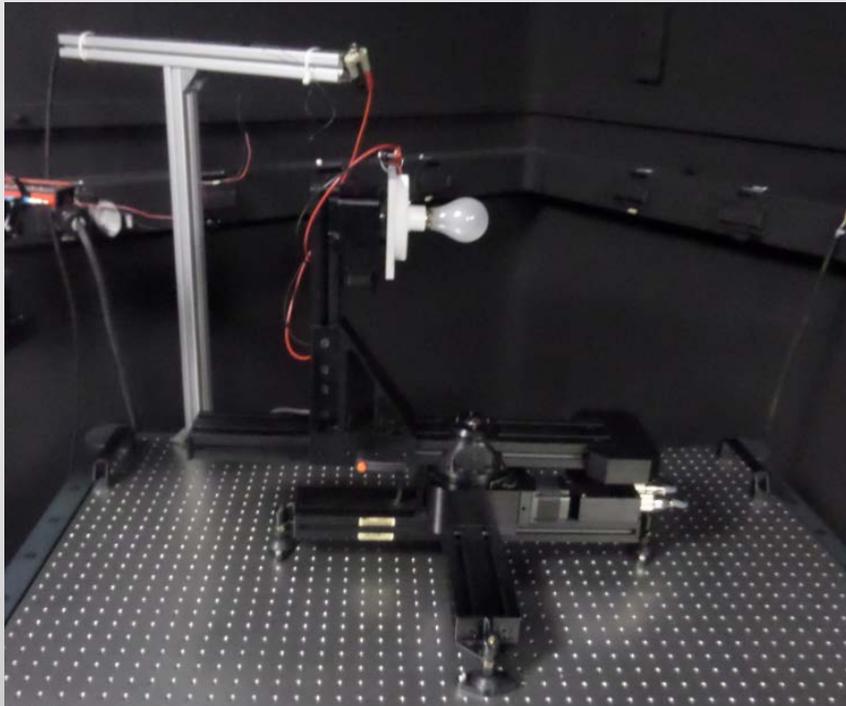


Electrical substitution radiometer cavity absorptance measurement  CrossMark

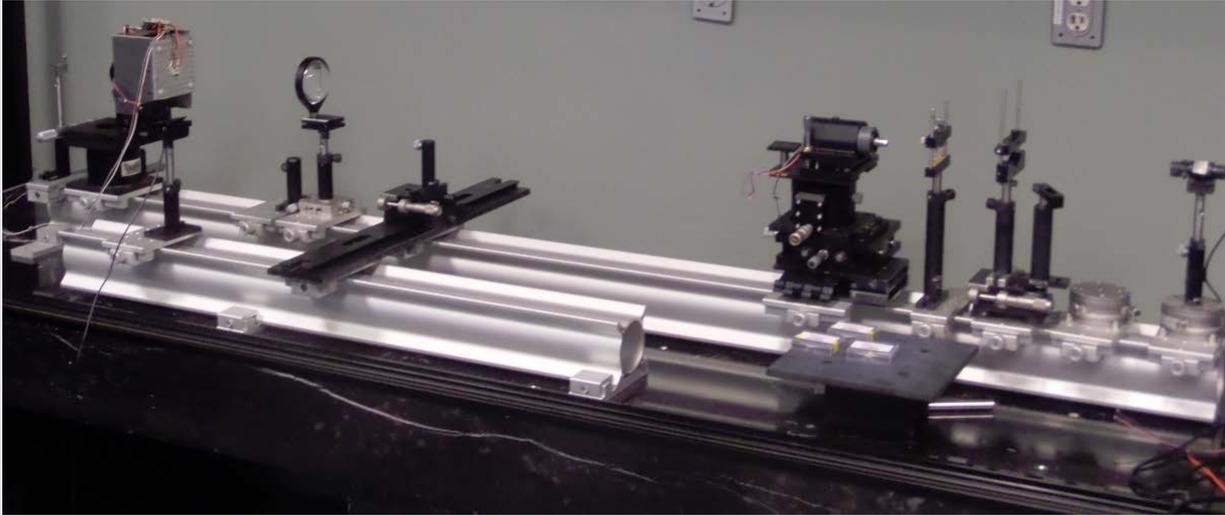
J.C. Molina ^{a,*}, Juan José Soto Bernal ^b, Hector A. Castillo M. ^a, Rosario Gonzalez ^b

^aCentro Nacional de Metrología, km 4.5 carretera a los Cués, El Marqués, Qro., Mexico
^bInstituto Tecnológico de Aguascalientes, Av. Adolfo López Mateos #1801 Ote, Fracc. Bona Gens, C.P. 20256, Aguascalientes, Ags., Mexico

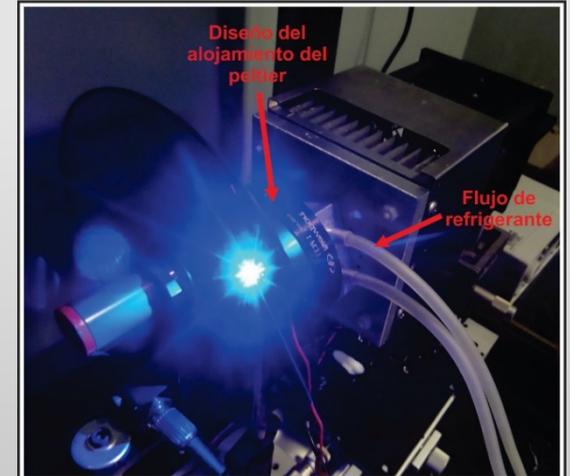
Formal participation in SSL comparisons



UV dose in wavelengths of 313 and 254 nm



More radiant flux with new models of LED UV radiation in 365 nm wavelength



Thank you