Consultative Committee for Photometry and Radiometry (CCPR)

25th Meeting (on-line 10-11 May 2022)

CCPR member report on activities in radiometry and photometry since the last CCPR meeting (2019)

Reply from: NMISA

Delegate: Rheinhardt Sieberhagen

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1. Summarize the recent progress in your laboratory with respect to measurement standards, research projects, and metrology services to fulfill the demands of customers in:

(a) Broad-band radiometric quantities:

- Procured new UV-C radiometers and UV array spectrometers for UVGI measurements.
- Development of UV-C high irradiance and UV-C flux calibration systems – ongoing.
- An automated *UV irradiance* calibration system is under development.
- Study on UVC devices available in South Africa that are used for COVID-19 disinfection.
- UVLED verification standards are being procured to verify a UV Goniometer.
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(b) Spectral radiometric quantities:

- Will participate in CCPC-K1.b.
- Photobiological Safety System was commissioned.
- Laser scattering measurement system developed.
- Cryogenic radiometry : A cleanroom lab will be constructed in a new lab to house the cryogenic radiometer and other measurement setups making use of the laser systems in the cryogenic radiometer laboratory.
- Laser power/energy : development project underway to calibrate photodiodes against a pulsed laser.
- Spectrally tuneable radiance source being developed to calibrate spectral imaging sensors.
- Implementation of spectral power responsivity measurement service on new monochromator system.

(c) Photometric quantities:

- Implemented a flicker measurement capability for LEDs.

- Development of a regional reference institute for LED measurement in support of Energy Efficient lighting for domestic lighting products and for the automotive, green and healthcare industries.
- Additional spectroradiometer procured in support of measurement services such as luminance responsivity, colorimetry, correlated colour temperature, correlated colour temperature responsivity, luminance factor and other spectral radiance measurements. To be calibrated in-house for spectral radiance responsivity in 2022.
- An additional method was developed for the calibration of luminous intensity standard lamps against a reference luminous intensity lamp. The current method is with a reference photometer. Due to the traceability route, the measurement uncertainty will be improved.
- A set of photometers will be sent for calibration at PTB. This imported traceability will be used for the next realisation of the candela.
- A 45°/0° spectrophotometer has been procured for the improvement of surface colour measurements.

(d) Other area(s) relevant to CCPR:

Spectrophotometry:

- Performing scattering in optical components using a custom measurement setup designed in cooperation with the client.
- Piloting UV Pilot Study on Spectral Regular Transmittance 200 nm – 400 nm: a new supplier for neutral density filters was identified, and filters will be delivered during 2022.
- Participation in APMP K5 comparison on spectral diffuse reflectance

2. What work in PR has been/will be terminated in your laboratory, if any, in the past /future few years? Please explain the reasons and provide the name of the institution if it has been/will be substituted by a DI or accredited laboratory.

   NA

3. Summarize the Capacity Building and Knowledge Transfer activities undertaken by your institute in photometry and radiometry (courses, training, …):

   - A UV radiometry course is being developed, aimed at engineers designing UV-C devices.
   - Participation in South African Bureau of Standards Working Group on UVGI Devices.
   - Provide use of laboratories and staff for practical sessions of courses presented by IESSA, the National Committee of CIE in South Africa.
   - Accommodation of industrial physics students from TUT (Tshwane University of Technology) for 6-month periods as part of their degree requirements.

4. Summarize the research projects currently performed within a collaboration with one or more NMIs or DIs (name of the project, participants):

- NMISA is a partner in the EMPIR WP2 project project on revision of LED standards (19NMR02 RevLEDStd)

5. Are there any other research projects where you might be looking for collaborators from other NMIs or are there studies that might be suitable for collaboration or coordination between NMIs?

   NA

6. Have you got any other information to place before the CCPR in advance of its next meeting?

   NA

7. Bibliography of radiometry and photometry papers of your laboratory since the last CCPR (September 2019):

i. L. Burger, P. du Toit, R. Sieberhagen, *UV Disinfection*, Sparks Magazine, May 2020.
ii. P. du Toit, R. Sieberhagen, L. Burger, *The ultraviolet calibration and measurement capabilities at NMISA*, Aug 2020.
iii. M Mkabela, PJW du Toit, L Burger, *UVGI devices in South Africa*, NLA Test and measurement 2021 Proceedings, Oct 2021
iv. I. Rabe, L. Burger, *The measurement of food colour to ensure brand consistency and quality*, Farmbiz Magazine, July 2020.
v. I. Rabe, R. Sieberhagen, P. du Toit, *Wavelength calibration of a monochromator system*, Submitted for SAIP (South African Institute of Physics) July 2022 Conference.