Consultative Committee for Photometry and Radiometry (CCPR)

24th Meeting (19 - 20 September 2019)

Questionnaire on activities in radiometry and photometry

Reply from: NMCC-SASO, Saudi Arabia

Delegate:

---

1. Summarize the progress in your laboratory in realizing top-level standards of:

   (a) broad-band radiometric quantities : No progress.
   (b) spectral radiometric quantities : No progress.
   (c) photometric quantities : New goniometer is under construction to realize the Spectral Radiant Flux scale in order to develop transfer standards for realizing Total Luminous Flux unit.

2. What other work has taken place in your laboratory in scientific or technological areas relevant to the CCPR?

   (i) Photovoltaics Calibration System, DSR method using LDLS based source and lock-in technique with solar simulator system.
   (ii) Spectrophotometer, double-grating based ratio-recording instrument (Optical/Spectral Properties of Materials).
   (iii) Gonio-spectroradiometer/photometer, for measurements of photometric, colorimetric and spectral characteristics of Luminaires (LEDs and OLEDs).
   (iv) Gloss/Haze Measurement System (Appearance Metrology).
   (v) Haze/Clarity Measurement System (Appearance Metrology).

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

   None.

4. What are present, new or emerging needs of users of your services that are not being supported sufficiently by current CCPR activities or initiatives? In the light of this information please suggest desirable changes in the future working program of the CCPR.

   (i) Opacity Measurements/Calibrations and SOP for calibration of Opacity meters (Plastic and Paper industries).
   (ii) New Nano solar cells, on-site characterizations (DSR, IV characteristics, efficiency, …etc.)
   (iii) Turbidity for water research.
   (iv) Gloss/Haze measurements standards development.

(v) Fiber Optics calibrations (highly emerging demand on calibrations Fibre optic power responsivity, Wavelength of a source, Wavelength of an OSA, OTDR (optical loss), OTDR Distance and location scale, Optical length (time of flight measurements for a delay line).
(vi) Whiteness/yellowness indices (food industry, tooth fillings)

5. What priorities do you suggest for new research and development programmes at NMIs in the area of Photometry and Radiometry?

(i) Newly developed multi-junction solar cell chips (synthesis and characterization).
(ii) Optical properties of materials (synthesis and analysis).
(iii) Spectral and Radiometric characterization of imaging sensors for remote sensing applications.
(iv) Using CCD/CMOS based cameras to study the surface textures and BRDF of complex materials (Appearance Metrology).
(v) Time-resolved Photometry using CCD camera.
(vi) Spatially-resolved Measurements of spectral Reflectance/Transmittance using CCD camera.
(vii) Few photon Metrology.
(viii) Developing miniature spectrometers using high precision linearly variable filters (arrays) and imaging arrays for space research.
(ix) Fiber Optics related research and calibration techniques of OTDR, OSA and wavemeters.
(x) Retro-reflection and related luminance/illuminance measurements systems for roads (safety concerns).
(xi) Light pollution measurements.
(xii) Characterization of space instrumentation.

6. Are there any 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?

(i) Primary Realization of Candela using the synchrotron radiation (source-based) and PQED (detector-based), as well as exchanging experience in these fields between different NMIs of different RMOs.
(ii) Collaborative projects in Appearance Metrology under CCPR.

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

None.

8. Bibliography of radiometry and photometry papers of your laboratory since the last CCPR (September 2016)?

(i) **Khaled Mahmoud**, Seongchong Park, Dong-Hoon Lee, "Development of a newly linearly variable edge filter (LVEF)-based compact slit-less mini-spectrometer," J. Phys.: Conf. Ser. 972 012026 (2018).

(ii) Ozcan Bazkir, Seval CENAK, **Khaled Mahmoud**, "Realization of pulse energy measurement traceability by linking of pulse and CW reference standards," J. Phys.: Conf. Ser. 972 012013 (2018).

(iii) **Khaled Mahmoud,** "Design of a new compact spectrometer based on a linearly variable edge filter", NEWRAD2017 proceedings, Tokyo-Japan, pp 222-223

(iv) Ozcan Bazkir, Seval CENAK, **Khaled Mahmoud**, "Realization of pulse energy measurement traceability by linking of pulse and CW reference standards", NEWRAD2017 proceedings, Tokyo-Japan, pp 160-161.

(v) Jung W, **Mahmoud K**, Lee D.-H, Park S, Yoo J.-K, Hwang, J, Jeong, K.-L, Kim, S.-K, Oh, K., "Performance evaluation of imaging spectrophotometer in the visible and infra-red region", Proceedings of CIE2017, Jeju, Korea Rep.