Consultative Committee for Photometry and Radiometry (CCPR)

24th Meeting (19 - 20 September 2019)

Questionnaire on activities in radiometry and photometry

Reply from: Measurement Standards Laboratory of New Zealand

Delegate: Annette Koo

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

   (a) broad-band radiometric quantities :
   Extension of UV meter calibration capability to include UV LED luminaires and near field measurement of extended UV sources.

   (b) spectral radiometric quantities :
   Establishing a facility to characterise single photon counters from 250 to 1600 nanometers.

   (c) photometric quantities :
   MSL has built a set of three new primary photometers, with f' numbers of better than 1.4%.

   (d) spectrophotometric quantities :
   Regular Transmittance - MSL published the final report for CCPR K6 and has since improved our CMC claims for this quantity.

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

   MSL has continued study into models and approaches to comparison analysis in order to support decision making by the CCPR.

   MSL has participated in an EMPIR study of BRDF in order to contribute to normalization documents in the field.

   MSL has established a service to evaluate photobiological safety of various light sources.

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.

MSL continues to receive enquiries relating to photobiological safety of light sources. The test methods recommended by documentary standards are not always fit for purpose (they do not replicate actual conditions of use of the luminaires and equations are not always suitable for the geometry recommended). It would be good to coordinate activity and a suitable response with other NMIs encountering similar issues.

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

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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?

   Single photon production and detection.

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

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

   Bae I.H. and Park S. and Hong K.S. and Park H.S. and Lee H.J. and Moon H.S. and Borbely J.S. and Lee D.H., Detection efficiency measurement of single photon avalanche photodiodes by using a focused monochromatic beam tunable from 250 nm to 1000 nm *Metrologia* **56**(3) 035003 (2019).

   Quast, T. and Schirmacher, A. and Hauer, K.-O. and Koo, A. Polarization properties and microfacet-based modelling of white, grey and coloured matte diffuse reflection standards *Journal of Physics: Conference Series* **972** (1) (2018)

   Liu, W.-C. and Hwang, J. and Koo, A. and Wu, H. and Leecharoen, R. and Yu, H.-L. APMP Pilot Study on Transmittance Haze *Journal of Physics: Conference Series* (2018) **972** (1)

   Strothkämper, C. and Ferrero, A. and Koo, A. and Jaanson, P. and Ged, G. and Obein, G. and Källberg, S. and Audenaert, J. and Leloup, F.B. and Martínez-Verdú, F.M. and Perales, E. and Schirmacher, A. and Campos, J. Multilateral spectral radiance factor scale comparison *Applied Optics* 56 (7) p. 1996-2006 (2017).

   Koo, A. Report on the consultative committee for photometry and radiometry key comparison of regular spectral transmittance 2010 (CCPR-K6.2010) *Metrologia* **54** 02001 (2017).