Comité Consultatif de Photométrie et Radiométrie (CCPR)

Strategic Planning Working Group (WG-SP), 8th Meeting

16 September 2014, BIPM, Sevres, France

Minutes, Version 3.1, 11th November 2014

Present

The following were present:

Participants:

Members of the WG-SP:

Dong-Hoon Lee KRISS
Jimmy Dubard LNE
Gaël Obein LNE
Peter Blattner METAS
Kathryn Nield MSL
Marla Dowell NIST
Gerald Fraser NIST
Maria Nadal NIST, SIM
Yoshi Ohno NIST
Tatsuya Zama NMIJ
Rheinhardt Sieberhagen NMISA, AFRIMETS (for N. Nel-Sakharova)
Nigel Fox NPL
Teresa Goodman NPL
Li-Lin Tay NRC
Joanne Zwinkels NRC, chair of WG-SP
Stefan Kück PTB
Armin Sperling PTB
Gerhard Ulm PTB
Lutz Werner PTB
Steven van den Berg VSL

Ex-officio members:

Takashi Usuda NMIJ (CIPM, CCPR president)
Michael Stock BIPM (Executive secretary of CCPR)

Observers:

Hector A. Castillo CENAM
Carlos H. Matamoros CENAM
Marek Smid CMI, EURAMET

Hsueh-Ling Yu CMS
Ana Paula D. Alvarenga INMETRO
Yandong Lin NIM
Peter Manson NMIA, APMP
Liu Yuanjie NMC-A*STAR
Erkki Ikonen MIKES
Joaquin Campos Acosta IO-CSIC
Boris Khlevnoy VNIIOFI, COOMET

Apologies:

Natasha Nel-Sakharova NMISA, AFRIMETS
Maria Luisa Rastello INRIM

1. Opening of the Meeting
- Introduction of Members and Observers

The meeting was opened at 14:00 by Joanne Zwinkels, chair of WG-SP. She welcomed the participants to the 8th meeting of the CCPR WG-SP. The following institutes are members of CCPR WG-SP: INRIM, KRISS, LNE, METAS, MSL, NIST, NMIJ AIST, NMISA, NPL, NRC, PTB, VSL.

2. Appointment of the Rapporteur and Approval of the Agenda
Peter Blattner, METAS, was appointed as Rapporteur.
Joanne Zwinkels presented a slightly revised second version of the agenda. There were some minor changes in respect to version 2 included with the working documents: At agenda item 10, Other Business, add: Presentation of draft CCPR poster for CGPM meeting (Michael Stock); and under agenda item 12.0 Next Meeting Date, add Discuss possibilities for liaisons/conference (new standing agenda item for WG–SP, recommended at 2013 WG SP Meeting).

3. Approval of the Minutes of the last meeting
Joanne Zwinkels thanked Steven van den Berg (VSL) for preparing the minutes of the last meeting. The draft versions were circulated prior to the meeting. The Minutes, Draft 2.1, were approved without any corrections.

4. Review of Action Items from the Minutes

AP-2013.1 Maria-Luisa Rastello to work with TG4 members to prepare feedback from CCPR WG-SP to CCU on outcomes and decisions from TG4 workshop including reformulation of candela and explanatory text. Target is to have this CCPR report approved by CCPR members in time for submission as working document for 21st meeting of CCU in June 2013.

Done informally but not presented to CCPR members before 21st meeting of CCU included in the working documents for this meeting (WG-SP 14-08)

AP-2013.2 Jimmy Dubard to investigate whether a workshop or special session on fiber optics/OTDR can be organized in conjuncture to the NEWRAD conference.

No action. Meanwhile in the framework of the EMRP, a meeting was held July 1-2, 201 about a project on fibre optics metrology. European NMI's and fibre optics industries were invited to participate in this meeting.

AP-2013.3 Dong-Hoon Lee to prepare terms of reference of a TG(s) as a successor of the discussion forum on Few Photon Metrology.

Done. To be discussed in Agenda item 6.

AP-2013.4 Jacques Morel to initiate the work on the OTDR comparison protocol.
Done. Discussion about the APMP OTDR comparison started in March 2014. The protocol is under way and may be submitted to the WG-KC in September 2014.

AP-2013.5 Michael Stock to publish the CCPR WG structure in a similar way to CCL on the BIPM website.

Done.

5. Documents Presented to the Meeting

- Draft of Agenda, version 2.0, for the WG-SP meeting on 16 September 2014 (CCPR WG-SP/14-01)
- Minutes of the 7th Meeting of WG-SP on 22 April 2013 (CCPR WG-SP/14-02)
- Proposal by Stefan Kück for new CCPR WG-SP TG on Single-Photon Radiometry (CCPR WG-SP/14-03)
- Membership of WG-SP Task Groups, effective 22 April 2013 (CCPR WG-SP/14-04)
- CCPR Strategy Document - 01 March 2013 (CCPR WG-SP/14-05)
- Newrad2014 presentation by Takashi Usuda on *Economic Impact* Measurement by CMC and CCPR Strategy (CCPR WG-SP/14-06)
- Comments from NMI Directors on 2013 PR Strategy Document and Responses from CCPR WG-SP TG10 (CCPR WG-SP/14-07)
- CCU presentation by Joanne Zwinkels on *Report from CCPR* to 21st meeting of CCU, 11-12, June 2013 (CCPR WG-SP/14-08)
- Draft version 5.2 of *mise en pratique* prepared by CCPR WG-SP TG5 (CCPR WG-SP/14-09)
- Draft version 3.2 of Principles Governing Photometry,2nd edition prepared by CIE JTC-2 (CIE-CCPR) (CCPR WG-SP/14-10)
- Draft Appendices and proposed change in symbols used in definitions of: illuminance, luminance, and luminous intensity for Principles Governing Photometry, 2nd edition prepared by T. Goodman (CCPR WG-SP/14-11)
- Request for membership in WG-SP from CSIC (CCPR WG-SP/14-12)

Presentations made at the meeting were added to the list of working documents after the meeting.

6. Reports of WG and TG Chairs and Matters Arising

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An overview of task groups was provided (CCPR WG-SP/14-04).

6.1 WG: Strategic Planning (Chair: Joanne Zwinkels)

A powerpoint presentation prepared by Joanne Zwinkels was tabled (CCPR WG-SP/14-13).

Last meeting was in April 2013. There are presently 12 members of WG-SP (INRIM, KRISS, LNE, METAS, MSL, NIST, NMIJ, NMISA, NPL, NRC, PTB, VSL) and ex-officio members (Michael Stock, BIPM, and Takashi Usuda, CCPR president). Since 2012 the RMO TC PR Chairs are ex-officio members

ToR have not changed since 2010, see http://www.bipm.org/en/committees/cc/ccpr/tor_wg-sp.html

Joanne Zwinkels gave an overview of the present TGs. TG1, TG2, TG3 are dissolved as their tasks have been accomplished. The current status of the other TGs will be presented in the WG Chair report but with the details of recent progress being given by the TG Chairs in their reports.

With TG10 members and T. Usuda and M. Stock, prepared Response to NMI Directors' comments on CCPR strategic plan (March 2013 document) WGSP-14-07. No further action was necessary.

Joanne Zwinkels outlined the priorities for the next 2 years:

- Find a consensus on the importance of photon based definition for the candela
- Complete following documents: new *mise en pratique* for the candela and 2nd ed. of BIPM/CIE publication on « Principles Governing Photometry » together with the CIE
- Update CCPR Strategy Document (March 2013) to address NMI Directors' request for economic impact studies on CMCs . How are we going to evaluate the impact in the field of

photometry and radiometry? This year's CCPR questionnaire included two questions for this purpose.

- Advance aims of Discussion Forums to create new technical-based TG on Few Photon Radiometry.

6.2 TG4: SI (Chair: Maria-Luisa Rastello)

Maria-Luisa, unfortunately, could not participate due to problems with her travel arrangements.
Action point AP1: report of TG4 to be submitted by mid- October 2014 to chair of CCPR WG-SP**.**

6.3 TG5: *Mise en pratique* (Chair : Joanne Zwinkels)

This TG was established in 2009 and in 2012 a workshop was organized. One of the outcomes was the creation of the JTC2 with CIE. A subsequent workshop was held on: SI units for Photometry & Radiometry, in April 2013 which resulted in the following decisions being made at the following WG-SP meeting: Work towards finalizing both these documents before CCPR 2014 meeting with current definition of candela. The new definition of units will not happen this year. Update, when reformulation is adopted by CGPM. The quantum nature of photon should be emphasized. Include link to photons in the *mep* of the candela however it should not be in the definition of candela. Draft 4.0 was prepared taking into account decisions at 2013 WG-SP meeting. The content was reverted back to 1979 definition of the candela and will be updated when reformulation is adopted by CGPM. In addition, it was decided to extend the scope of *mep* for candela and other photometric units to include associated radiometric units. In 2014 a draft 5.0 and 5.2 were prepared and approved by TG5 and included in WG-SP 2014 documents (CCPR WG-SP/14-09).

Some of the meeting attendees privately communicated with the TG5 Chair during the meeting breaks that they had concerns with some of the content of the present version. There was not sufficient time at the meeting to discuss these concerns. Thus, the following action was proposed by Joanne Zwinkels.

Action point AP2: CCPR members are to provide input (comments/corrections) to Chair of TG5 on the review of *mep* (version 5.2) before mid-October 2014. If there are serious concerns, these should be raised soon to be able to have a consolidated version distributed to WG-SP by mid October 2014. The goal is to circulate the WG-SP approved *mep* document to the full CCPR for approval by end of October 2014. This CCPR-approved *mep* document would then be available to Dr.Usuda for presentation at the next CIPM/CGPM meeting.

Dr. Usuda indicated that whether or not the *mep* receives unanimous support by CCPR, it will be tabled by CIPM. Yoshi asked a question about Michael Stock being listed as a member of TG5. Joanne Zwinkels and Michael confirmed that he is an official (not ex-officio) member of this TG.

6.4 TG6: Discussion Forum on Fibre Optics (Chair: Jimmy Dubard)

A powerpoint presentation prepared by Jimmy Dubard was tabled (CCPR WG-SP/14-14).

Jimmy Dubard reported on the difficulties to organize a workshop due to little interest of the industry for metrology in radiometry. IEC 86 dedicates only ½ day to metrology and only few instrument manufacturers participate. IEC is presently not focusing on the metrology because there is no new revision of their standard. Eventually there will be a need for standardization after the outcome of a project that he is going to outline:

In the framework of the new European Metrology Programme for Innovation and Research (EMPIR) a new project proposal dedicated to metrology for the photonics industry - including optical fibres, waveguides and applications – is being elaborated(IND22). 6 NMIs, 7 companies and universities are

involved. Jimmy Dubard presented the IND22 project proposal which is composed of the following three work packages:

WP1: To develop traceable online and offline metrology techniques for dimensional and optical characterisation
WP2: To develop metrology of terahertz transmission links and for optical printed circuit boards
WP3: To develop metrology for improved traceability of fibre optic measuring instruments

Further information is given in the presentation.

6.5 TG7: Discussion Forum on Few Photon Metrology (Chair: Dong-Hoon Lee)

A powerpoint presentation prepared by Dong-Hoon was tabled (CCPR WG-SP/14-17).

The TG was formed in 2009. In April 2013 a questionnaire was circulated between the NMIs to get guidance for the future work of the TG.

In October 2013 during the first face-to-face meeting of TG7 at Oak Ridge National Lab, the following two topics were discussed. A proposal by Stefan Kück (PTB) for a new "TG on single photon radiometry" and the future of TG7. The former proposal is discussed in detail in Section 6.5.1

Dong Hoon presented a proposal for the following new ToR for TG7:

1. To discuss the outstanding issues in the field of few photon metrology
2. To monitor the advances and demands in the field of few photon metrology
3. To monitor and initiate standardization activities in the field of few photon metrology

Dong Hoon asked the following questions: Can we publish technical guidelines similar to the model of CIE? Can a Discussion Forum TG of CCPR carry out a similar guidance role to the CIE but in the specific field of few photon metrology where no standardization organization is addressing this need? Dong Hoon said that recommended best practices and standardization are needed in this emerging field.

Nigel Fox (NPL) is concerned with what seems to be a vacuum. If the few photon community wants standards, there must be a standardizing organization that addresses this need for the potential users. This standardization focus would need to come from one or more industry sectors.

Stefan Kück (PTB) commented that in Europe there is standardization in this field dealing with communication technology.

Gerald Fraser (NIST) asked if IEEE was involved in standardization in this field and it was replied no. He also asked if it was too early to standardize in this field. There should be some freedom for the technology to develop.

Peter Blattner (METAS) mentioned that there is a CIE reportership on single photon metrology. A report could also be published in CIE.

Doon Hong asked for help for improving the ToR. Nigel Fox asked if it would be better to show that there is a problem of traceability rather than on needs for standardization since this is not a mature field.

The following revised ToR for TG7 were agreed by WG-SP:

1. To discuss the outstanding issues in the field of few photon metrology
2. To monitor the advances and demands in the field of few photon metrology
3. To monitor and report on needs for SI traceability in the field of few photon metrology

6.5.1 Proposal for new WG-SP TG on Single-Photon Radiometry (Chair: Stefan Kück)

Based on a questionnaire sent to the members, a new TG on single photon radiometry is proposed.

The terms of reference of the new TG are:
- To discuss about a pilot study on the detection efficiency of single photon detectors
- To create a questionnaire about a pilot study on the detection efficiency of single photon detectors for possible participants of such a pilot study
- To organize and carry out a pilot study on the detection efficiency of single-photon detectors.

The TG shall include participants from NMIs and experts from academia and industry.

The timeline for future work is, as follows: A questionnaire will be sent out in Dec 2014 and replies collected until June 2015 for the pilot study. It is planned that the technical protocol is approved by Dec 2015, the comparison can then start by January 2016 and end in December 2016.

Joanne Zwinkels commented that this new task group will be TG11.

The proposal for the new TG was approved unanimously by CCPR WG SP.

6.6 TG8: Discussion Forum on THz Metrology (Chair: Marla Dowell)

Last meeting of the TG it was decided to focus on a pilot comparison of detector responsivity at two frequencies: 0.762 THz and 2.52 THz Currently the following laboratories will participate: NIST, PTB and NIM. PTB is organizing the comparison.

Gerhard Ulm (PTB) referred to the discussion on this pilot comparison during the WG-KC meeting where Dong Hoon (KRISS) had asked if this should be carried out within WG-KC. Joanne Zwinkels (NRC) asked where the pilot comparison belongs and if it is a key comparison quantity. G. Ulm replied that it is just an extension of K2 in a different spectral range (THz) and therefore could become K2.e.

Joanne Zwinkels asked the following questions: Qhat are the future plans of TG8? Are there other NMIs that have become active in this field of metrology? What is the nature of the collaboration with CCEM?

Gerhard Ulm (PTB) said that the only activities in this field are detector comparison activities.
Yandong Lin (NIM) said that research in this field has been carried out at NIM for quite a few years, including spectral responsivity and spectral reflectance and transmittance. He will give additional information in the NIM progress report at the CCPR meeting.
Tatsuya Zama (NMIJ) said that there are some activities at NMIJ but they are not yet ready for participation in the planned pilot comparison.

Gerald Fraser (NIST) asked if the work being carried out at these NMIs deals with coherent or incoherent radiation as there is a special need from space applications for incoherent radiation (including imaging).

Marla Dowell (NIST): ask if there should not be another questionnaire focussed on free-space radiometric applications that does not include imaging or spectroscopy.

Nigel Fox (NPL) said that there is a lot of interest in optical properties of materials (e.g. spectrophotometric reflectance and transmittance measurements in the far-IR) and not only about radiation and detectors.

Action point AP3. TG8 Chair (Marla Dowell) will prepare a new questionnaire specifically for space and astronomical applications and distribute to NMIs active in the field; Nigel Fox and Gerald Fraser also agreed to provide input.
Deadline: January 2015

Joanne Zwinkels asked about CCEM activities on terahertz. Michael Stock replied that there was no reported activity at the recent CCEM meeting.

6.7 TG9: OTDR length comparison (Chair: Jacques Morel)

Jimmy Dubard (LNE) presented the progress of TG 9 on behalf of Jacques Morel. The goal of this supplementary comparison is to underpin CMCs. In a first step, focus is given on the optical fibre length. So far 9 NMIs have expressed their interest to participate. Two sets of artefacts, realized by KRISS and METAS, will be used. It is not definitely decided how the comparison will be organized (option 1: star-type; option 2: two loops; option 3: one loop; and option 4: two loops but with different artefacts to have the loops running in parallel). There is some preference to go with option 2 since the artefacts are known to be reasonably stable. The draft of the protocol is presently being discussed within the task group. The timeline is for the comparison to start in January 2015 and to end in March 2017.

Yoshi Ohno (NIST) mentioned that this is not exactly a star type comparison because the same artefacts are circulated. The new WG-KC guidelines recommend having different artefacts and running the comparison in parallel. However, he noted that it is a supplementary comparison and not a key comparison. Yoshi then asked if there were other cases where the same artefacts were used in some star-like comparisons. Joanne Zwinkels (NRC) replied that even in the 1st round of key comparison K6, the same artefact was circulated to more than one lab (i.e. two loops). Yoshi remarked that CCPR WG-KC might need to change the guidelines.

6.8 TG10: Ad hoc on CCPR Strategy document (Chair: Joanne Zwinkels)

A powerpoint presentation prepared by Joanne Zwinkels was tabled (CCPR WG-SP/14-15).

In March 2013 the CCPR strategic document was posted at the BIPM webpage. NMI Directors reviewed all CC's Strategic Plans. The specific comments on the CCPR strategic plan were mainly from two NMIs:
PTB – concerns about required resources and the fact that quantities & spectral ranges in 2nd and 1st rounds are nearly identical.
NPL – summary of CCPR activities should include reference measurements related to carbon measurement infrastructure.

Nigel Fox (NPL), Doon Hong Lee (KRISS) and Michael Stock (BIPM) provided responses to these specific questions/comments. However, no revised version of CCPR strategy document was prepared. Dr. Usuda confirmed that there was no need to do so in response to the NMI Directors' comments.

Joanne Zwinkels also presented the NMI Directors' general comments that were common to many of the CC's strategy documents (see presentation). In particular, there was a request for economic impact information of the uncertainty of CMCs from our stakeholders. There were two new questions (9 and 10) in the 2014 CCPR questionnaire to the NMIs that were included to solicit information to answer this question. This topic is discussed in more detail in Section 6.8.1.

In the CCPR strategy document, the following major issues were identified for CCPR:

- Find a consensus on the importance of photon based definition of the candela
- Develop the new *mise en pratique* and the guidance document on "Principles of Photometry" together with CIE
- Develop new fields like few photon metrology, fibre optics, THz metrology

6.8.1 Follow-up discussion on revision of CCPR strategy document and CCPR

Joanne Zwinkels asked for an open discussion by all participants on identifying other economic impact examples in the field of photometry and radiometry,

Takashi Usuda presented the draft BIPM work programme for the coming 4 years. It shows the summary for activities in the different fields of metrology. For radiometry and photometry the document states “The field is relatively stable, and the methods mostly mature. Fundamental comparability is achieved at the required levels by NMIs using their cryogenic radiometers. Focus in the field is to make their uncertainty available in a convenient and cost effective way for applications (noting recent new lighting sources such as solid state lighting face difficulties in their evaluation).”

Takashi Usuda suggested that the work programme should include the possibility to have ad hoc activities in the field of photometry and radiometry (or in other fields) at the BIPM, when the necessity would arise. This proposal was not supported by the Director of the BIPM.

Takashi Usuda mentioned his CCPR President’s report for the upcoming CGPM. He would like to focus on 4 important topics: energy, environment and climate, health and quality of life, and security, and to present economic impact of the work of CCPR. He invites CCPR members to give input on success stories.

Erkki Ikonen (MIKES) presented a possible calculation of the impact for solid state lighting. This showed that: Improvement of luminous efficacy of LED luminaires by 1% saves globally electrical energy of value of 4’000’000’000 Euros /year.

Peter Blattner (METAS) said that this calculation of impact doesn’t really reflect reality. Industries presently don’t care about measurement uncertainties. Only if the associated written standards and regulations explicitly require that the measured values and its uncertainty be smaller than a limit value, will it be possible to create impact by decreasing the uncertainty.

Takashi Usuda asked if there was pressure from our stakeholders to reduce our measurement uncertainties? He also gave an example from the field of fibre optics. There should be an industry that asks for smaller uncertainties.

Marek Smid (CMI) said that the approach described by Erkki could also be given for photovoltaics for implementing energy savings. Other important impacts of improving uncertainties in this field do exist for safety and fair trade (reducing technical barriers to trade).

Gerald Fraser (NIST) said that it would be good to highlight the SSL field. He mentioned the recently published IEA 4A SSL proficiency testing results. He said that NIST had carried out an economic impact study on the activity in SSL and the need for direct traceability. He said that he would provide the link to this NIST study.

Joanne Zwinkels asked Nigel Fox (NPL) about the demanding needs for lower uncertainties in earth observation studies. He confirmed that there are clear requirements for improved uncertainties for this application where the required uncertainties in radiance measurements, for example, can only be provided at the NMIs and not yet be transferred into space. He said that this would be a good example of an urgent need for improved PR uncertainties and he could provide some data for a slide on climate observation applications. Another example could be carbon stored in forests. Another possibility is to refer to the document “Value of information for climate observing systems” [1] In this document there are some calculations.

Gerald Fraser (NIST) said that another example could come from weather prediction from satellites, including farming, where radiance models are now used to improve predictions. Lower measurement uncertainties would improve the quality of these predictions, although it would be difficult to obtain associated economic impact data.

[1] Roger Cooke , et at. " Value of information for climate observing systems", Environment Systems and Decisions, March 2014, Volume 34, Issue 1, pp 98-109.

Action Point AP4. The following volunteers (in parentheses) are to submit examples of economic impact of measurement uncertainties to Takashi Usuda for the following four fields: Climate (Nigel Fox and Gerald Fraser), SSL (Yoshi Ohno and Erkki Ikonen), Photovoltaics (Stefan Kück and Marek Smid) and Optical Properties of Materials (Kathy Nield and Joanne Zwinkels). Deadline for submission is end of October 2014.

Joanne Zwinkels summarized the answers from the CCPR 2014 questionnaire on the following two questions:
Q.9) Do you have any feedback from any stakeholders that they are currently using the CMC part of the KCDB database? If yes, please name the stakeholders/customers from which you have had most feedback (highest first). Feedback was given by three NMIs:

- LNE
  Stakeholders in the space/environment industry in relation with Metesat 3rd generation satellite instruments characterization and calibration. Traceability with low uncertainty requirements in the 400 nm- 15000 nm spectral range.
  Stakeholders: Thales Alenia Space, Bertin.
- KRISS
  In March 2014, 2 major manufacturers of LED chips in Korea, SAMSUNG Electronics and LG Innotek, have recognized the efforts of KRISS for establishing measurement standards for LEDs and their international equivalence through piloting the SCs. Since these companies have established their standards for performance test based on the standards and techniques of KRISS, the CMC publication of KRISS effectively supports reliability of their product specifications.
- METAS
  received very few feedback from stakeholders, mostly from other NMI's (outside of the CCPR) and private companies (manufacturers of high precision measurement devices) who were aware of the CMC database

And Q 10) Please provide "success story of CIPM-MRA: Who employed CMCs and what benefit they have gotten" in PR fields? Feedback was given by to NMIs:

- MSL
  Transmittance calibration artefacts for linearity and wavelength calibration are routinely used to characterize spectrophotometers. These simple reference tools underpin many chemical assay tests. In New Zealand this would apply to, for example, Fonterra, New Zealand's biggest exporter of dairy products, they require confidence in chemical tests for export requirements. Developers of appliances incorporating either LED or laser diode technologies need photobiological safety testing of light sources to international documentary standards. These standards require traceable measurements of optical power. Light is pervasive in modern technology. Photometric and radiometric measurement underpins the successful and consistent deployment of these technologies, be they mobile phone screen displays, car signaling systems, fibre optic communication etc. The need for reliable calibration and measurement capabilities should not be underestimated.
- PMOD/WRC
  PREMOS on the French satellite PICARD is the first spaceborne absolute radiometer measuring Total Solar Irradiance that has been irradiance---calibrated in vacuum with SI---traceability. The measurements of PREMOS at first light on July 27, 2010, yield a TSI value of 1360.9±0.4 W/m2 (k=1). This value agrees with the absolute TSI value measured by TIM/SORCE for this date within their combined uncertainties, and it differs by more than ten sigma from the absolute value of other space experiments, e.g. VIRGO/SOHO. The PREMOS measurements thus establish SI-traceability to a solar constant value of 1361 W/m^2 (Schmutz et al. 2013).

6.9 CIE JTC-2 (CIE-CCPR): Principles Governing Photometry (Chair: Yoshi Ohno)
A powerpoint presentation prepared by Yoshi Ohno was tabled (CCPR WG-SP/14-10)

The terms of reference are to prepare a comprehensive joint CIPM/CIE publication on 'Principles Governing Photometry' that will include all photometric quantities and units with CIE Standard spectral luminous efficiency functions for photopic, scotopic and mesopic regions.
The JTC was established in April 2012 as proposed by CCPR WG-SP TG5 *mise en pratique* on the candela.

Yoshi Ohno presented the table of contents of the current document. He mentioned that the focus is on implementing the mesopic luminous efficiency functions defined in CIE 191. In addition the inclusion of other CIE spectral luminous efficiency functions is discussed.

The document is mostly finished. However there is a lot of on-going discussion about the definition of the luminance which is outlined in the appendix. Yoshi Ohno presented different possible forms of the equation and Teresa Goodman (NPL) explained the compromise solution that was proposed in the appendix to this document. She stressed that the document has stimulated a lot of discussion and it is important to find a widely-accepted solution.

The tentative timeline is to finish the document by the end of this year.

Armin Sperling (PTB) mentioned that the definition should also be harmonized with ISO 80000. The deadline for ISO 80000 for DIS stage is February 2015 and for the FDIS is January 2016. The approval process will need to go through both CCPR and CIE.

Nigel Fox (NPL) asked if radiometry shouldn't be included in the "Principles Governing Photometry". Joanne Zwinkels replied that this has been previously discussed by WG-SP and it was decided to not explicitly include it in this document but to include the link to radiometry and to photons in the *mise en pratique.*

7. Report from BIPM (M. Stock)

Not given because of lack of time. The report will be given during CCPR.

8. Report from CIE (P. Blattner)

Not given because of lack of time. The report will be given during CCPR.

9. Review of membership: Chair & members of Working Group & Task Groups

Request for membership in WG-SP by CSIC (Joaquin Campos Acosta)

Joaquin Campos Acosta justified the request for becoming a member of the CCPR WG-SP in accordance with the WG-SP Membership Criteria approved by CCPR in 2013. He mentioned that CSIC-IO is a small DI but the main focus is on SI units and that he could contribute to the Task groups on the SI and the Strategic Plan and regularly reviewing and updating the *mise en pratique*. The membership request is supported by Joanne Zwinkels and Maria Luisa Rastello.

The request was approved unanimously by CCPR WG-SP.

10. Other Business

- Matters arising from other CCPR Working Groups (WG-KC, WG-CMC)

Not discussed

- Presentation of draft CCPR poster for CGPM meeting (Michael Stock)

Michael Stock presented a draft version of a poster that will be presented at the next CGPM. The first draft was prepared by him and reviewed and refined by a few members of WG-SP; this ad hoc group will provide further inputs and feedback until mid-October 2014. Michael noted that the intended audience for this poster is not that technical and this poster should have limited text and follow a standard format specified for all of the CC posters.

11. Recommendations to CCPR

There are three recommendations from WG-SP to be presented at the CCPR meeting:

WG-SP/14-R1 Creation of new WG-SP Task Group, TG11:

The ToR of the new TG are:
- To discuss about a pilot study on the detection efficiency of single photon detectors
- To create a questionnaire about a pilot study on the detection efficiency of single photon detectors for possible participants of such a pilot study
- To organize and carry out a pilot study on the detection efficiency of single-photon detectors.

WG-SP/14-R2 Change in the terms of reference of TG7

The following revised ToR were approved by WG-SP:

1. To discuss the outstanding issues in the field of few photon metrology
2. To monitor the advances and demands in the field of few photon metrology
3. To monitor and report on needs for SI traceability in the field of few photon metrology

WG-SP/14-R3: Add CSIC to membership of WG-SP

12. 0 Discuss possibilities for liaisons/conferences (new standing agenda item for WG-SP, recommended at 2013 WG-SP meeting)

This topic was not discussed due to lack of time.

12.1 Next meeting date

To be discussed at CCPR meeting.

13. Adjournment

The meeting ended at 17:55.