



## Training session on the calibration and verification of ILMDs provided by the EMPIR JRP 19NRM02 RevStdLED

On 23.-24. May, 2023, a training session on the calibration and verification of imaging luminance measurement devices (ILMDs) including aspects for the measurement uncertainty will be held as an in-person event at the Physikalisch-Technische Bundesanstalt (PTB) in Braunschweig, Germany.

Scholars of the training are relevant representatives from the consortium of the normative joint research project (JRP) "Revision and extension of standards for test methods for LED lamps, luminaires and modules" (EMPIR JRP 19NRM02 RevStdLED) which addresses Traceable measurements using ILMDs inside its Work Package 1.

### Content:

The training session will introduce a Good Practice Guide for setting up an uncertainty budget for the measurement of luminance distributions which is developed inside the JRP RevStdLED and will discuss the role of tolerances for the resulting measurement uncertainty. Beside reviewing fundamentals of the measurement method as well as mandatory adjustment and calibration procedures for ILMDs, the aspects that are necessary for the verification of the model of evaluation by the operator are explained using examples. The training will namely include practical demonstrations about relevant systematic measurement errors, i.e. non-linearity and non-uniformity of ILMDs and stray-light inside the measurement devices. These practical demonstrations inside optical measurement laboratories of PTB will include a focus on how to avoid potential errors in such verifications. Also potential artefacts originating from temporal light modulation (TLM) with respect to different measurement principles, i.e. a global shutter or rolling shutter, will be considered. In addition, the calibration of luminance standards based on LEDs or incandescent lamps, that are typically included in the traceability chain for measurements with ILMDs, will be shown.

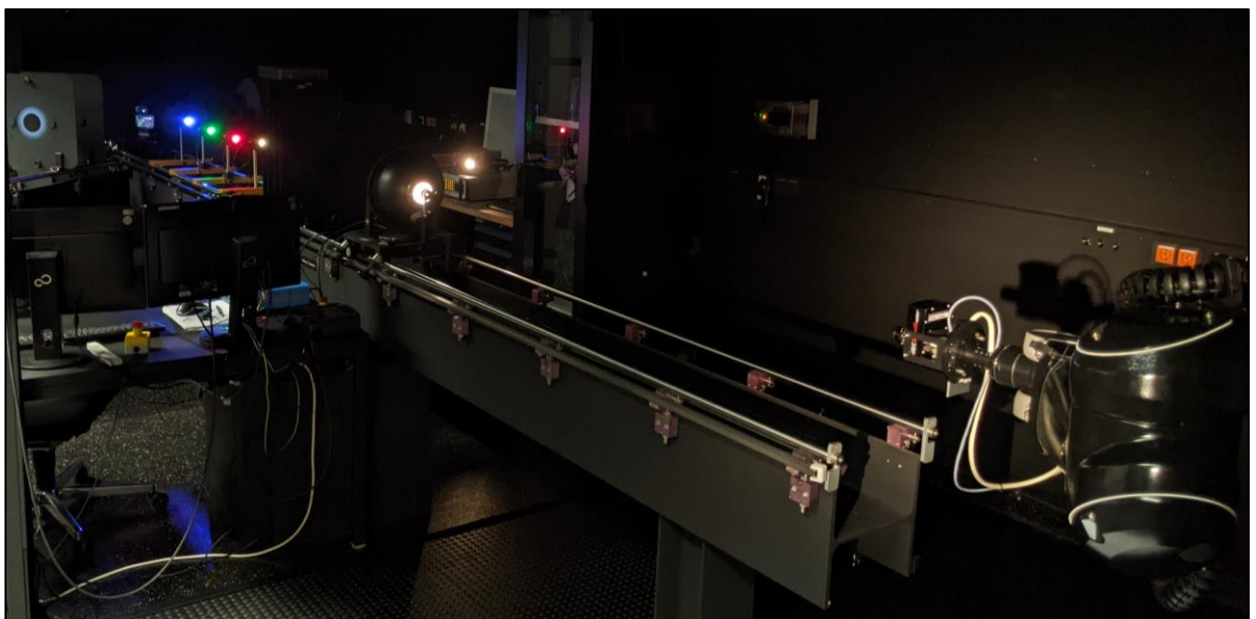


Photo of the ILMD characterization setup based on an industrial robot at the photometric bench of PTB.



## Targeted audience and prerequisites:

The training session addresses technicians and engineers of testing laboratories and instrument manufacturers who deal with uncertainty of measurements based on ILMDs. In addition, operators of ILMDs inside National Metrology Institutes are invited as well.

Participants are expected to already have substantial knowledge in the field of luminance measurement prior to the event, i.e. from operating ILMDs on their own, as well as on principles regarding traceability and measurement uncertainty. In particular it is requested that each participant already has the [Technical Report CIE 244:2021](#) “Characterization of Imaging Luminance Measurement Devices (ILMDs)” at hand and with them inside the training as the Good Practice Guide will not repeat the content of this already published normative document.

Participants are expected to be familiar with the vocabulary of CIE 244:2021 and with the basics of [JCGM 100:2008](#) “Guide to the expression of uncertainty in measurement (GUM)” including its Supplement 1 (JCGM 101:2008) and Supplement 2 (JCGM 102:2011).

## Registration for the Training:

Please register for the training session via E-mail to [johannes.ledig@ptb.de](mailto:johannes.ledig@ptb.de) by 2023 May 8<sup>th</sup>. Subsequently a confirmation of registration and detailed information about the agenda including the training location and useful information on public transport will be provided. The preliminary Good Practice Guide will be provided to the participants prior to the training session.

## Administrative Information:

The training session is provided free of charge as an in-person event for two full days in Braunschweig, Germany. Participants need to cover their own travel expenses. A registration in advance to the training session is required. Due to the practical demonstrations the number of participants is restricted.

Date: 23.-24. May 2023  
Location: Physikalisch-Technische Bundesanstalt (PTB) Braunschweig  
Bundessallee 100, 38116 Braunschweig, Germany  
Registration: by 8<sup>th</sup> May 2023 via E-mail to [johannes.ledig@ptb.de](mailto:johannes.ledig@ptb.de)  
Contact: Dr. Johannes Ledig, Phone: +49 531 592 4120

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