EMPIR 15SIB07 PhotoLED
Future Photometry Based on Solid-State Lighting Products

Need for the project

- Phasing out of incandescent lamps (EU 2020 Energy Strategy)
  -> Incandescent calibration lamps are phasing out as well!
- High uncertainties in SSL luminous efficacy (lm/W) measurements
  -> IC2013 Comparison: ±5 % spread with over 100 test laboratories
- Standardisation, International Commission on Illumination (CIE)
  -> Urgent need for LED Illuminants for Photometry and Colorimetry

Objectives

- Develop new LED-based standard lamps for photometric calibrations
  -> Replace old luminous intensity and luminous flux standard lamps
- Reduce uncertainties of SSL efficacy at test laboratories down to 1 %
  -> By utilising the new calibration lamps and measurement methods
- Develop new LED calibration spectra & discuss the progress with CIE
  -> To allow calibration of photometers with physical white LED sources

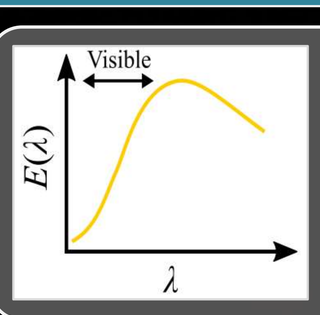
New System of Photometry Based on White LED-sources

WP1: Photometric standards based on white LED-sources

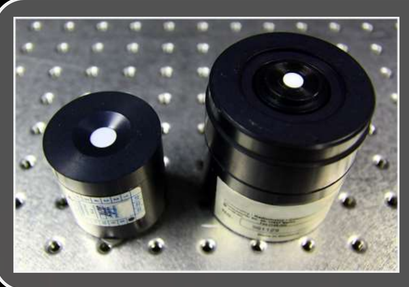
- Calibration spectra based on typical white LED products
  -> Replace CIE Standard Illuminant A in photometer calibrations
  -> Reducing spectral errors to 1/3 in measurements of LED products
- Photometric LED standard lamps: Luminous intensity and flux
  -> Replace incandescent standard lamps in photometry

WP2: Realisation of LED-based photometric scale

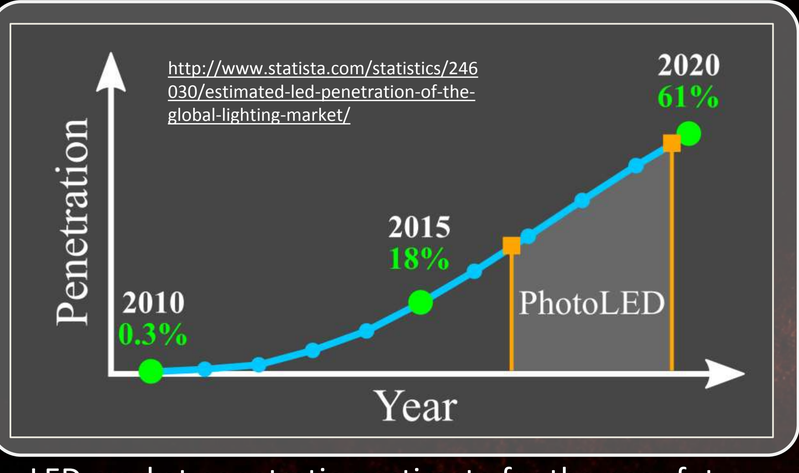
- PQED-reference photometers without optical $V(\lambda)$-filters
  -> To replace $V(\lambda)$-filtered reference photometers at NMIs
  -> Target uncertainty 0.2 % in white LED illuminance
- First ever comparison with LED-based transfer standards
  -> To replace old incandescent lamps in intercomparisons

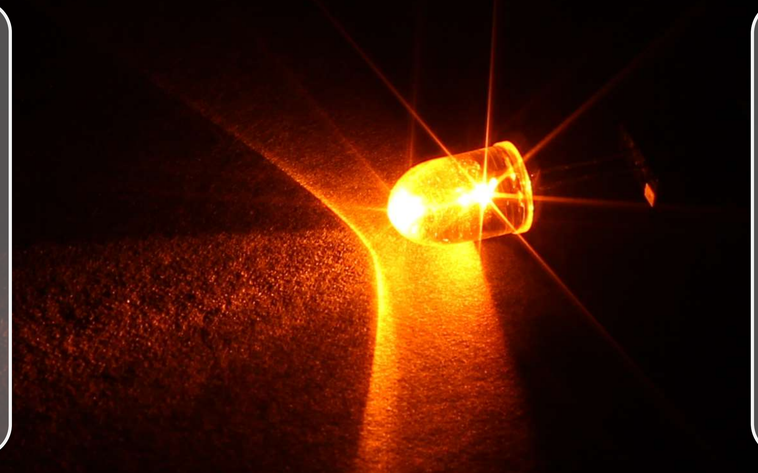
New LED-based photometric standard lamps for luminous intensity and luminous flux



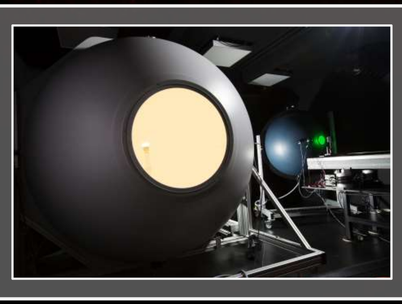

New Reference PQED-photometers without optical $V(\lambda)$-filters for NMIs



LED market penetration estimate for the near future



Reducing CO_2 emissions by more reliable measurements


Reliable testing of SSL products by lowering uncertainties at test laboratories



Measurement of light with photometers calibrated using LED standard lamps

WP3: Transfer of luminous flux to test laboratories

- Novel fish-eye camera for spatial correction of SSL products
- Full characterisation of the DC- and AC-operated flux lamps
  -> Luminous flux and spectral radiant flux to test laboratories
- First ever luminous flux comparison using LED standard lamps
  -> Demonstration of 1 % uncertainty of SSL luminous efficacy

WP4: Creating impact

- Revolutionary photometric system with full support for SSL
- Excellent connections with CIE -> Actions by new standards
- Business opportunities for industrial project partners
- Reliable testing of new SSL products coming to market
  -> Achieving the goals of EU2020 energy-saving strategy

General information

- 3-year EU-funded project, Coordinated by VTT, Finland
- Running 1 September 2016 – 31 August 2019
- Consortium: 10 NMIs, 3 Universities, 4 Industrial partners
- Official project website http://photoled.aalto.fi

Collaborators & Stakeholders

- Become a member of the Stakeholder Committee
- Let us hear your opinions about measurement of SSL
- Three workshops / training courses will be arranged
  -> Be among the first to test the developed methods!

Partners and collaborators, Sept 2016