

ADMESY

Colorimeters

Spectroradiometers

Lightmeters

2D Imaging

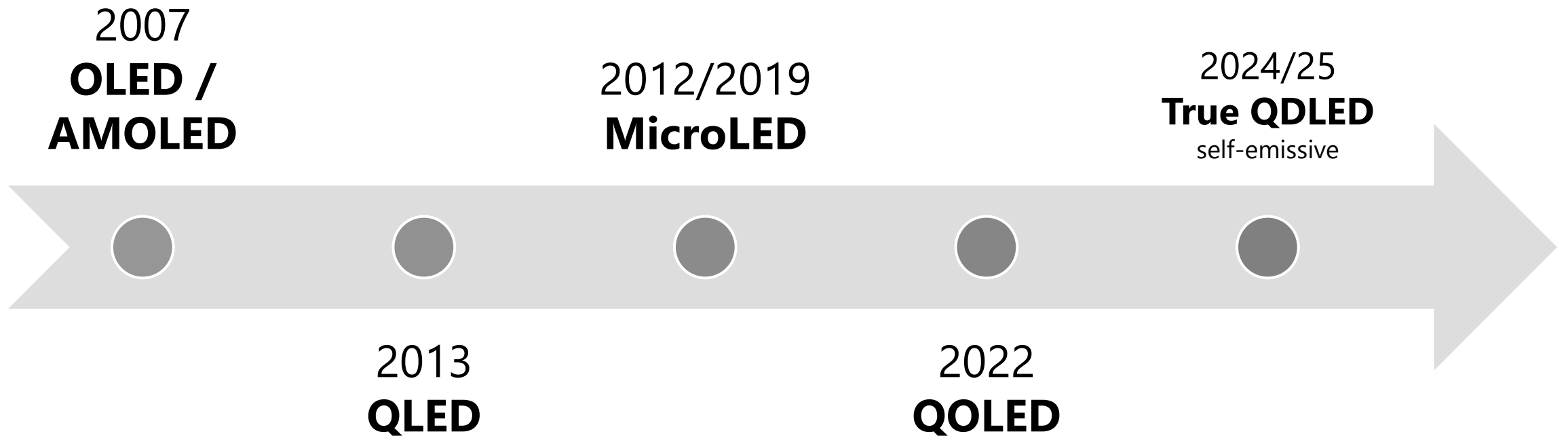
admesy.com

Measurement of New Display Technologies

EPIC Online Technology Meeting on Photonics for
New Display Technologies

9 December 2024

New Display Technologies



Emerging Measurement Needs

1. High contrast, High Dynamic Range – HDR

▷ **Low luminance** $\sim 0.01 \text{ cd/m}^2$

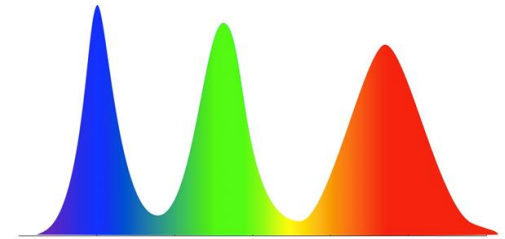
lowest real-world $\sim 0.005 \text{ cd/m}^2$

▷ **High luminance** $> 3\,000 \text{ cd/m}^2$

up to $20\,000 \text{ cd/m}^2$ and above for backlight units



2. Highly saturated color – narrow “peaky” spectral power distributions in Wide-Gamut-Displays



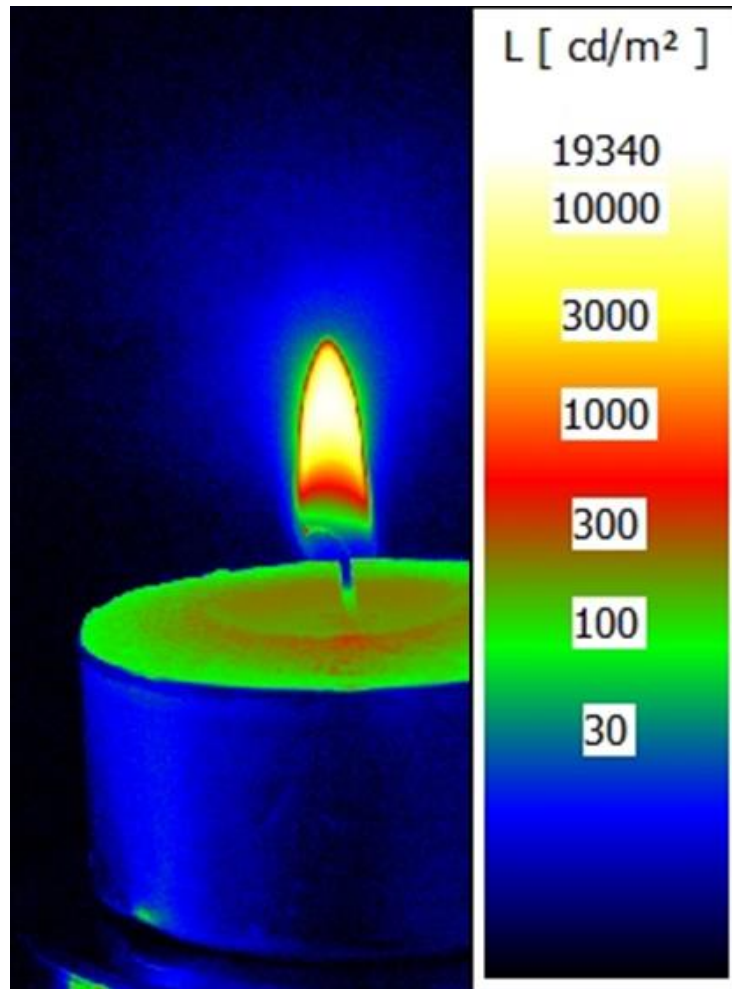
3. Small displays / pixel level evaluation

4. Viewing angle characteristics

▷ Color, gamma, contrast

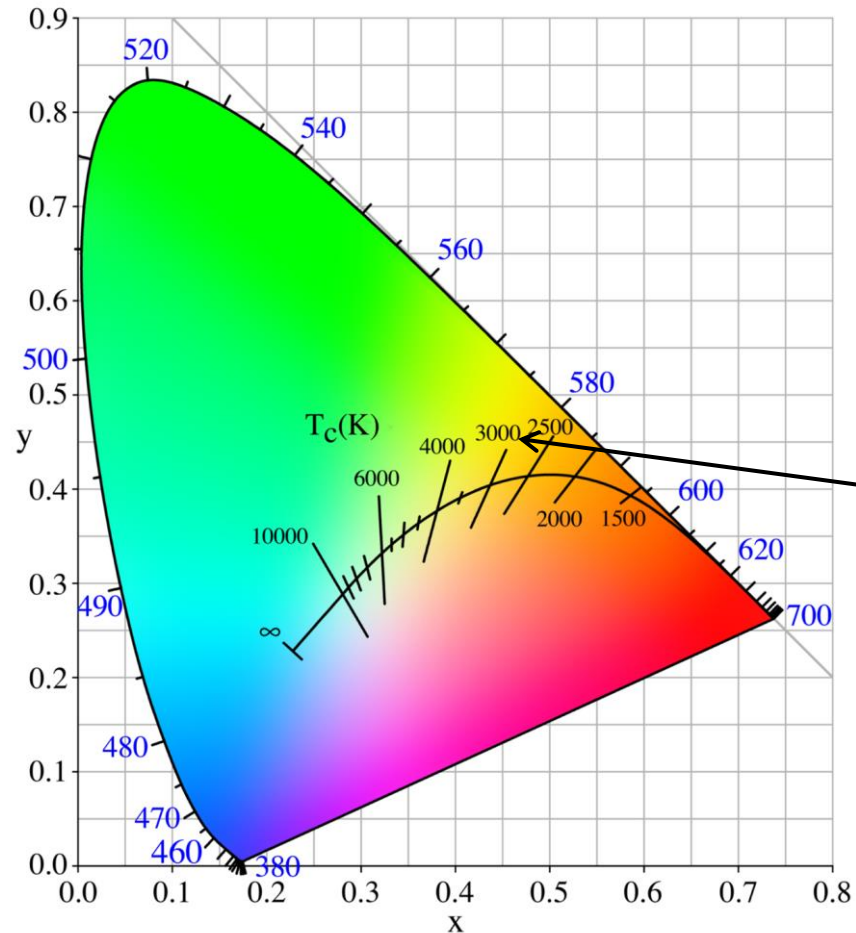


What to Measure? Luminance L



~ "Brightness"

What to Measure? Chromaticity xy

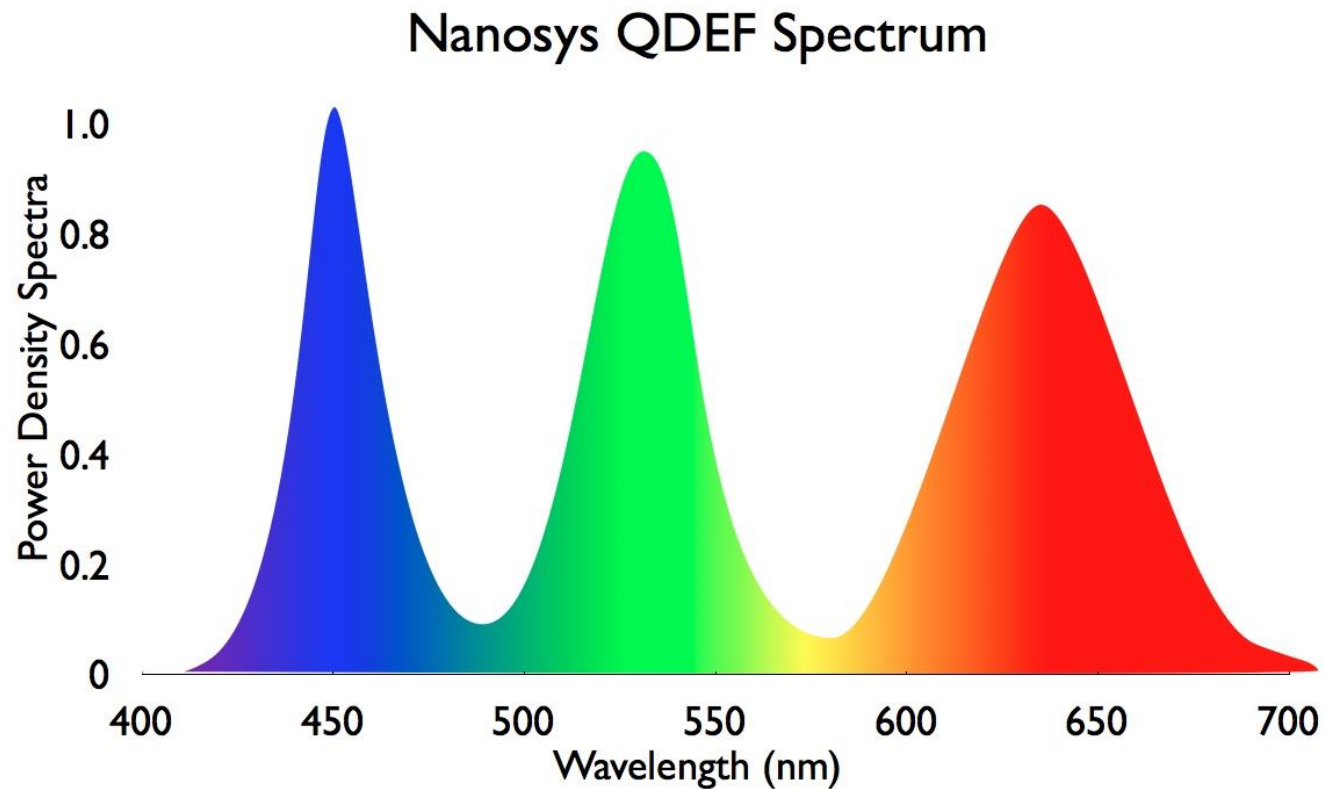


Tristimulus values $XYZ \rightarrow xy$



Color

What to measure? Spectral Power Distribution



Example:

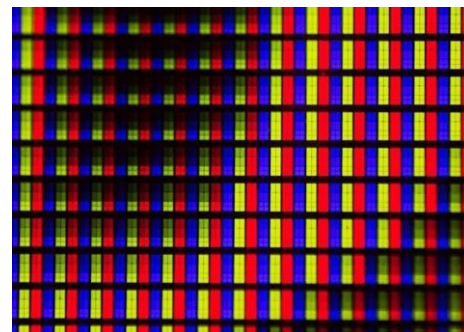
Spectral Power Distribution
Quantum Dot Enhanced Film

How to Measure?

	Luminance Y	Tristimulus XYZ	Spectrum
Spot	Prometheus series PCM2 series Luminance Flicker meter Colorimeter Viewfinder spectrometer Prometheus Radiance calibration light source		
2D imaging	Titan & Helios series Integrated spot meter XYZ filter wheel Y Luminance filter		-



Spot measurement



2D imaging
spatially resolved



Low / High Luminance Measurements

- ▶ High Sensitivity

 - ▷ 0.000 025 cd/m² in 1sec

 - ▷ 0.005 cd/m² in 0.5 s

- ▶ Low noise

 - ▷ Dark-current handling

 - ▷ Cooled sensor

- ▶ Large dynamic range 0.000 5 – 10 000 000 cd/m²

 - ▷ SNR 1300:1

 - ▷ Neutral Density filters

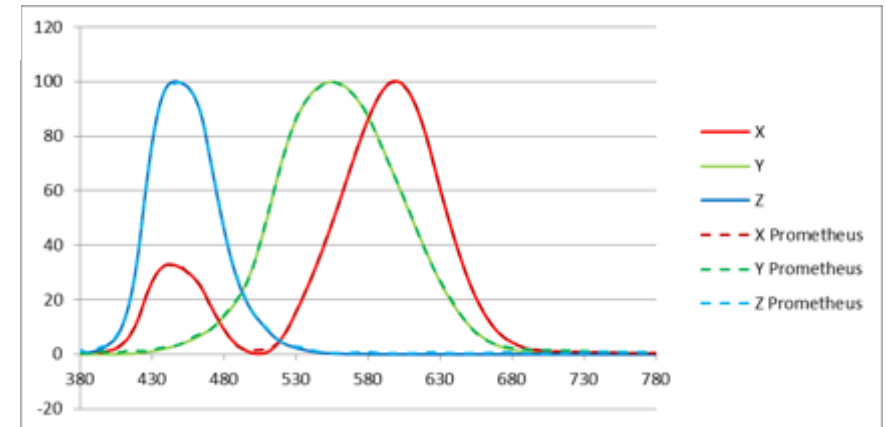
 - ▷ Ultra-high luminance sampling mode

Prometheus colorimeters



Narrow "Peaky" Spectral Power Distribution

- ▶ Best possible filter-match to the human eye in colorimeters and 2D imaging
 - ▷ Small $f1'$ error, uniform
- ▶ High-resolution
 - ▷ FWHM of 2.8 nm or smaller
 - ▷ Wavelength accuracy of 0.06 nm



Fit of filters to
CIE 1931 color-matching functions

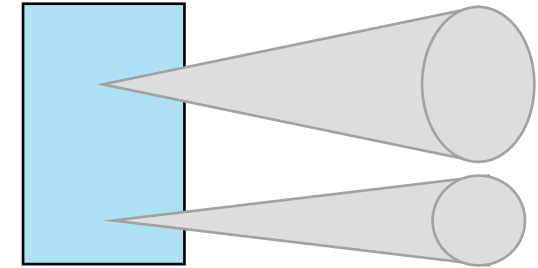
Small Displays

- ▶ Colorimeter probes with spot sizes down to 2 mm
 - ▷ Unique dual spot probes
(2/2 mm, 3/10 mm, 3/5 mm ...)
- ▶ Spectroradiometer with small measurement angle and macro lens option
 - ▷ Smallest possible spot size 0.33 mm!

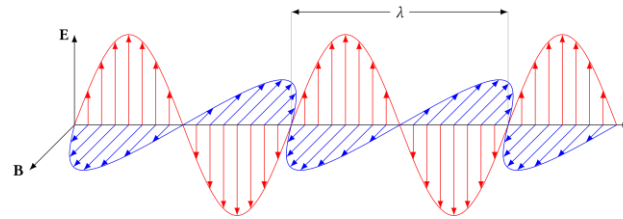


Viewing Angle Characteristics / Dependency

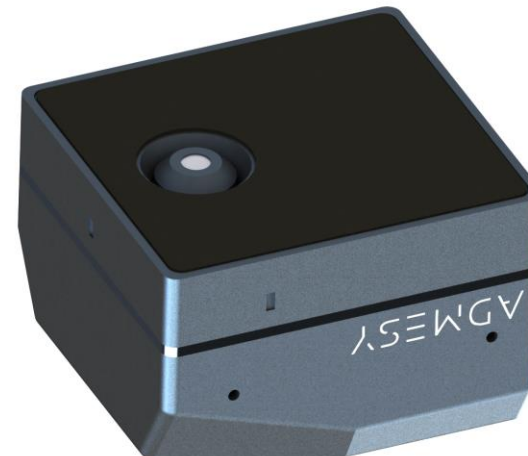
- ▶ Small (enough) acceptance angle for colorimeters
 - ▷ For most displays Admesy advises 5 degree or less acceptance angle



- ▶ Low polarization sensitivity



- ▶ Conoscope to assess the viewing angle performance



Admesy Colors Your World

Admesy offers

- Display Testing Solutions
 - Accurate
 - Easy to integrate
 - Robust
- Development of custom products
 - Quick development cycles
 - Innovative designs – Patents
 - Extensive experience in high-end filter coatings

Admesy is looking for

- Potential partners

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