

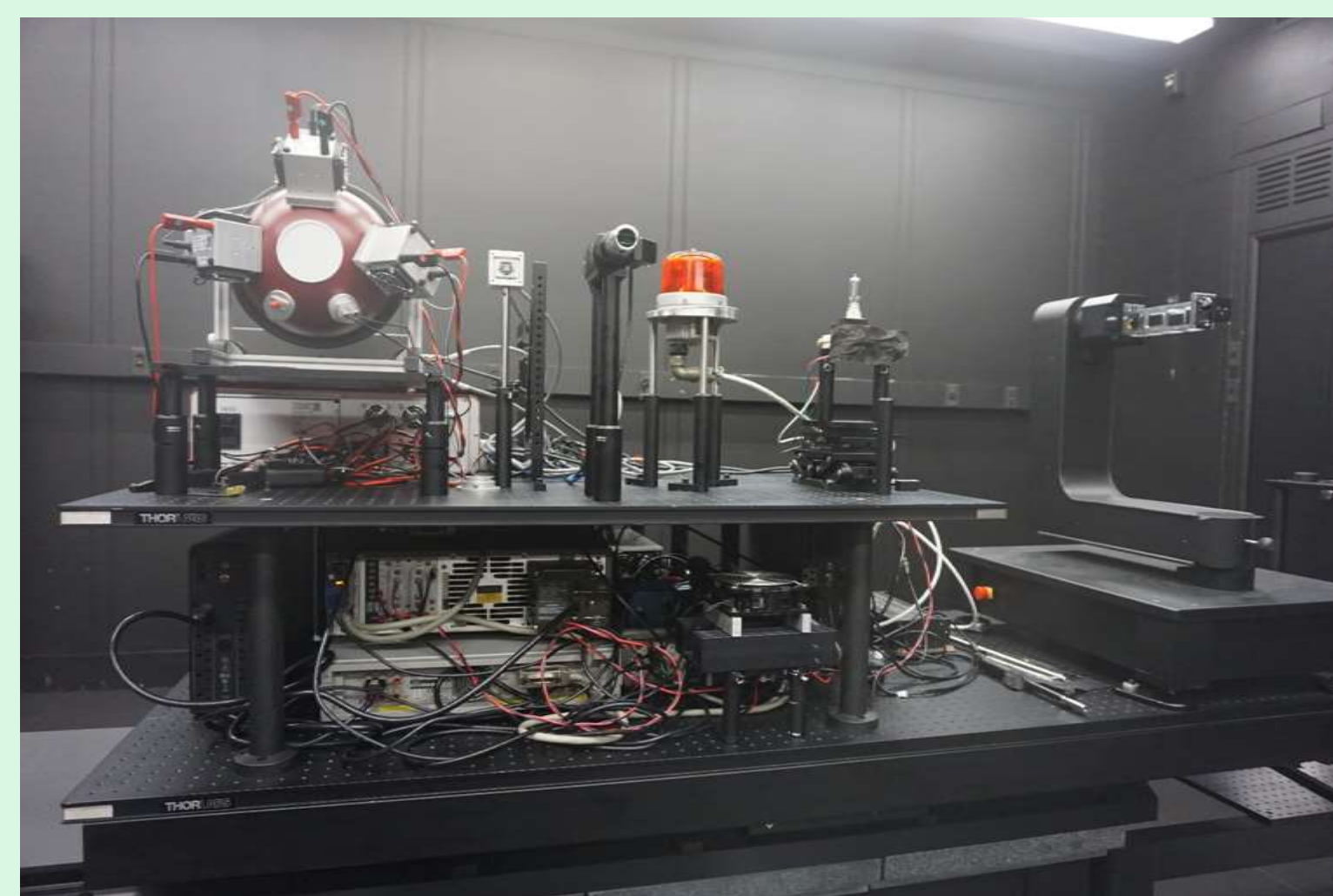
Improvements in optical metrology for solid-state lighting

Yuqin Zong, Benjamin Tsai, & Cameron Miller
National Institute of Standards & Technology

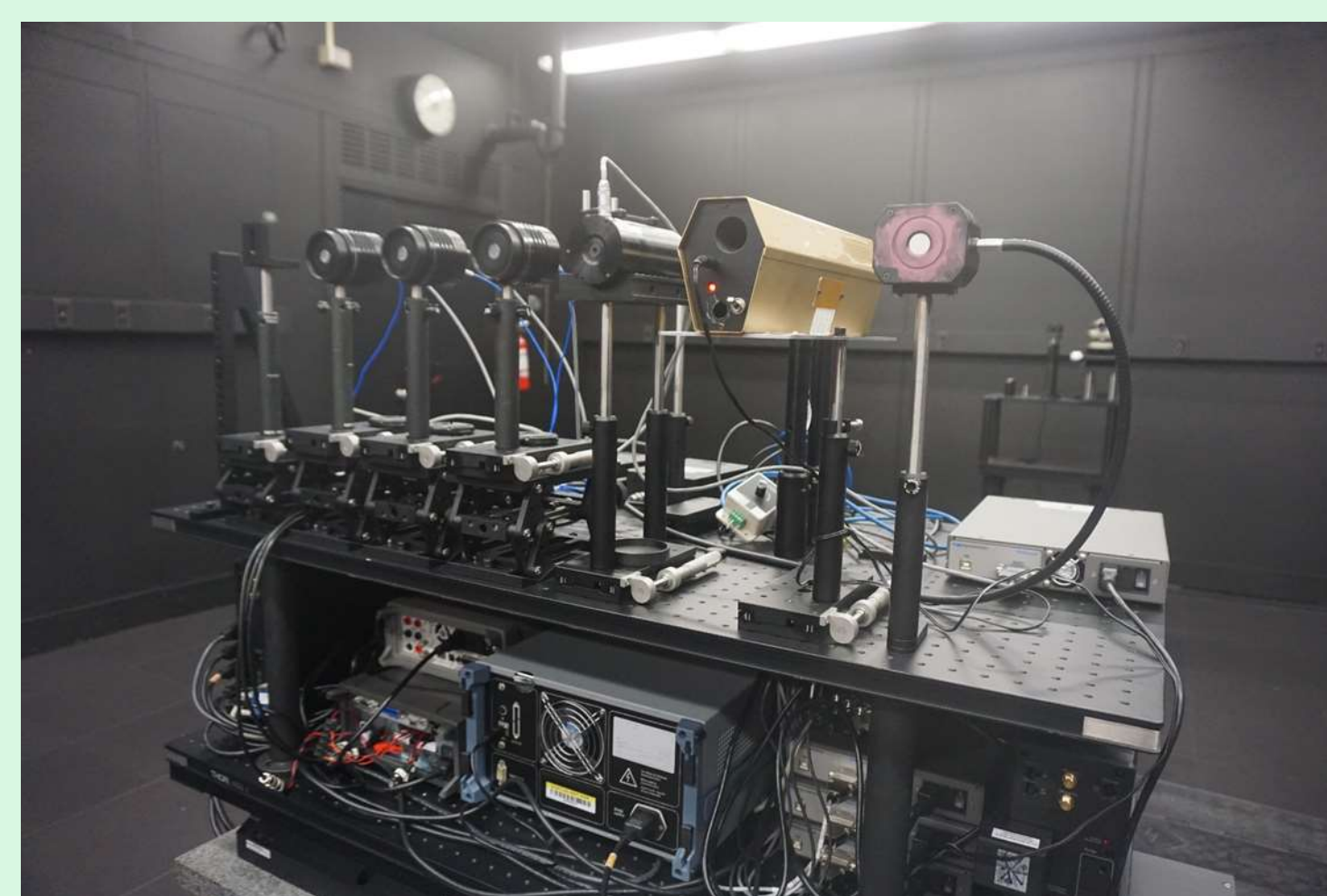
New Photometric Bench



6 m ball screw, 5 m travel,
 $\Delta d = 50 \times 10^{-6}$ m

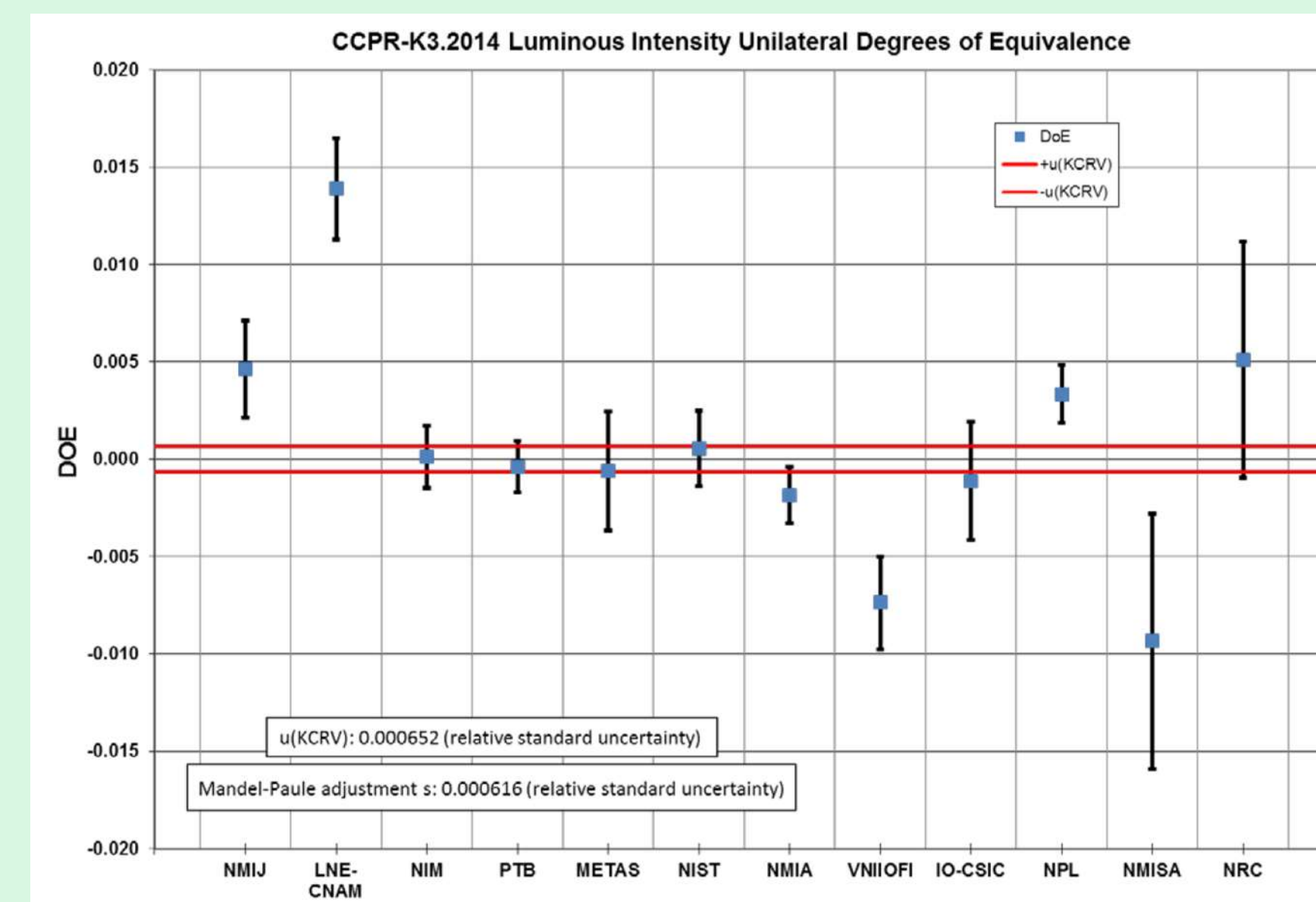


1.5 m long travel sources stage
for FEL lamp, LED, flashing
light, integrating sphere,
tunable laser,
goniophotometer



0.8 m long travel sensors stage for photometer, colorimeter,
radiometer, spectroradiometers, cameras, hyperspectral imagers

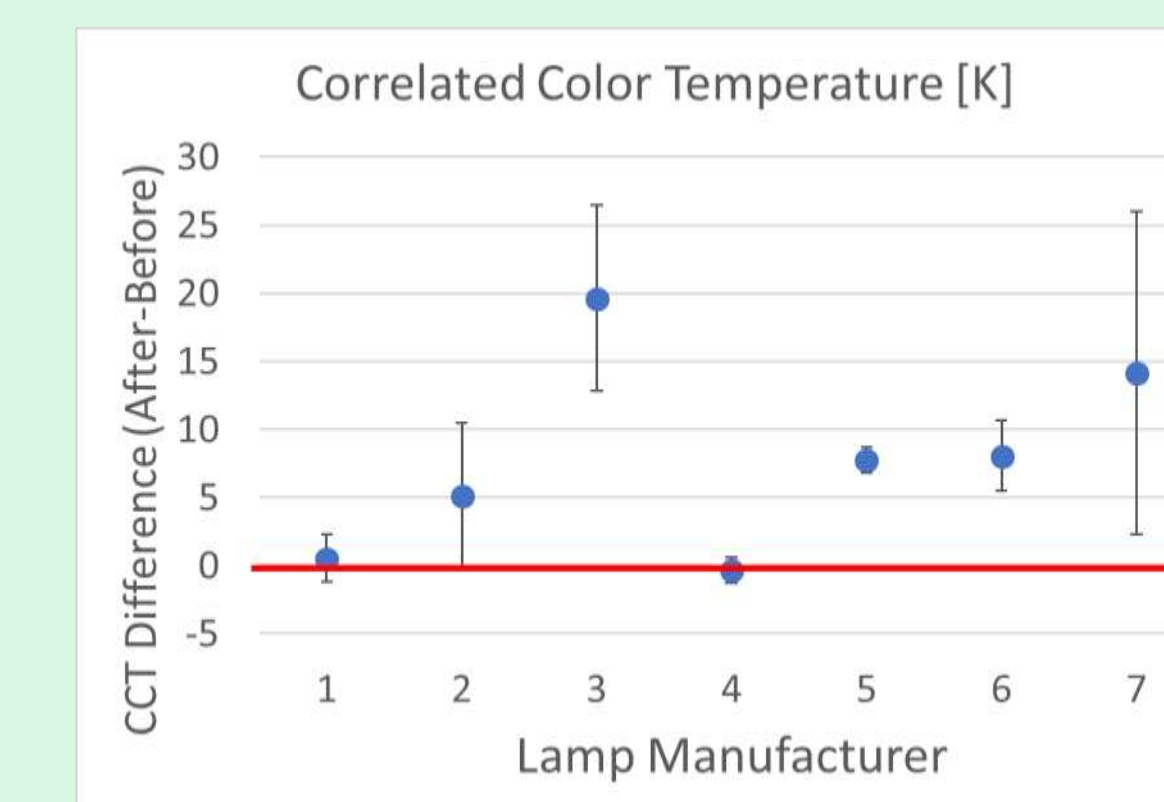
Key comparisons (K3)



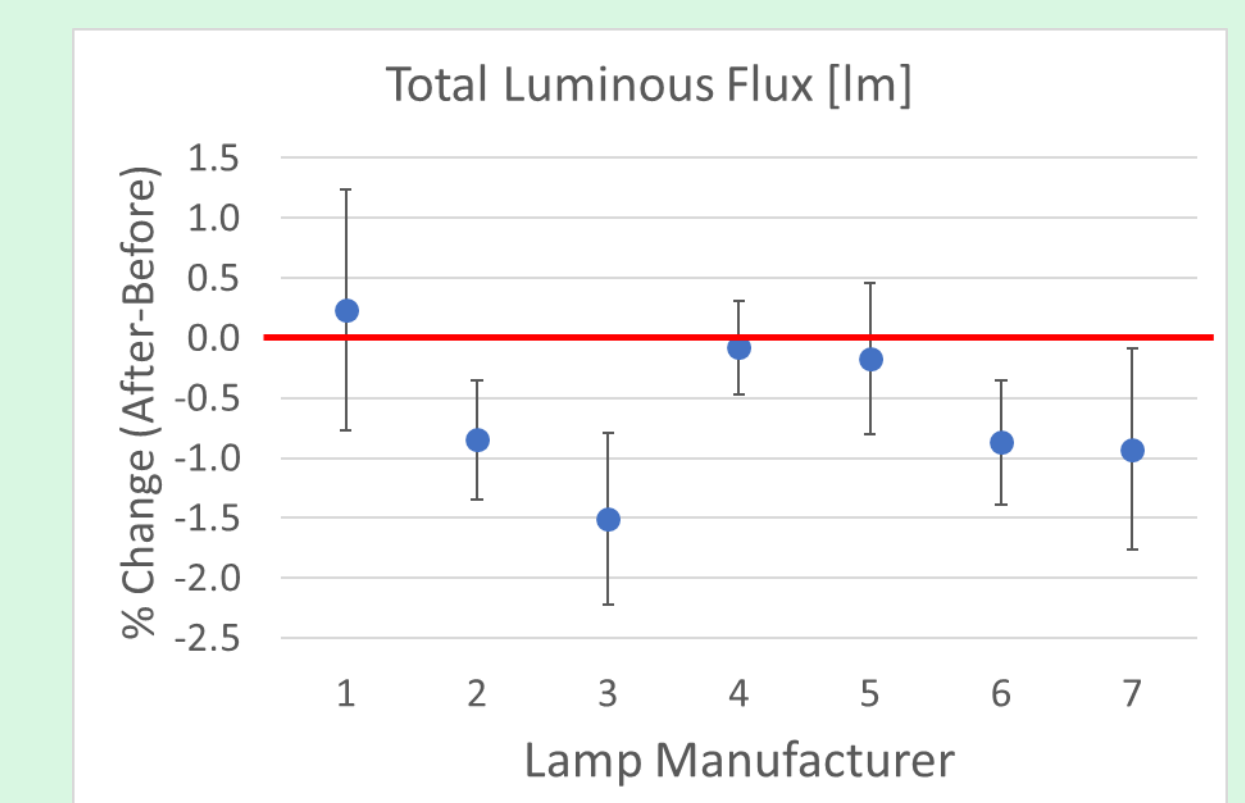
Dissemination of SI unit candela (since 1901)
Sources: candela – 0.25 % ($k=2$)



- Luminaire & Lamp Tests**
1. Storage test
 - High temp/High humidity
 2. Operational test
 - Power cycling (30 s on/30 s off)
 - High temp & power cycling
 3. Electromagnetic test
 - Electrical transient susceptibility
 4. Mechanical test
 - Vibration



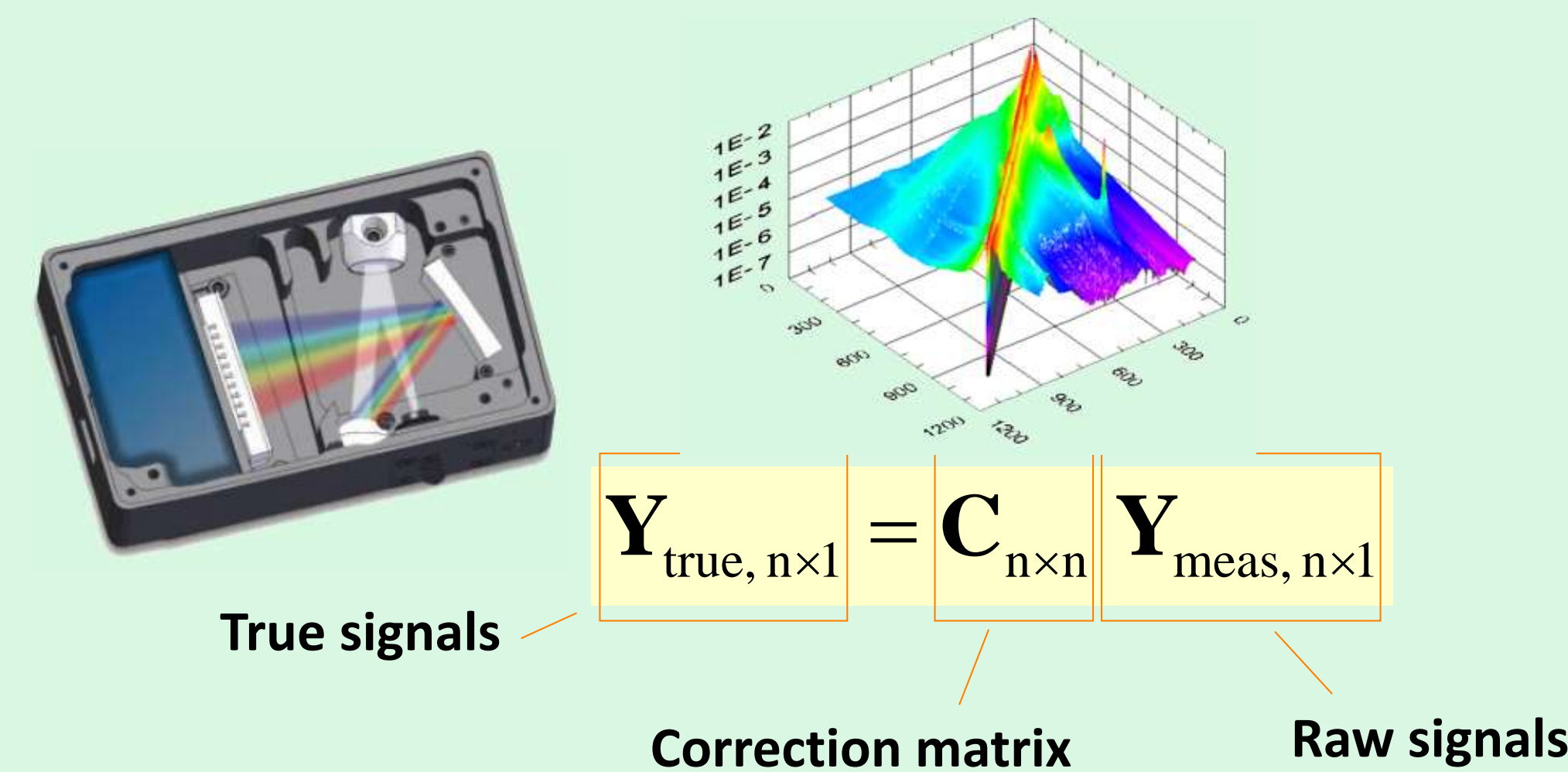
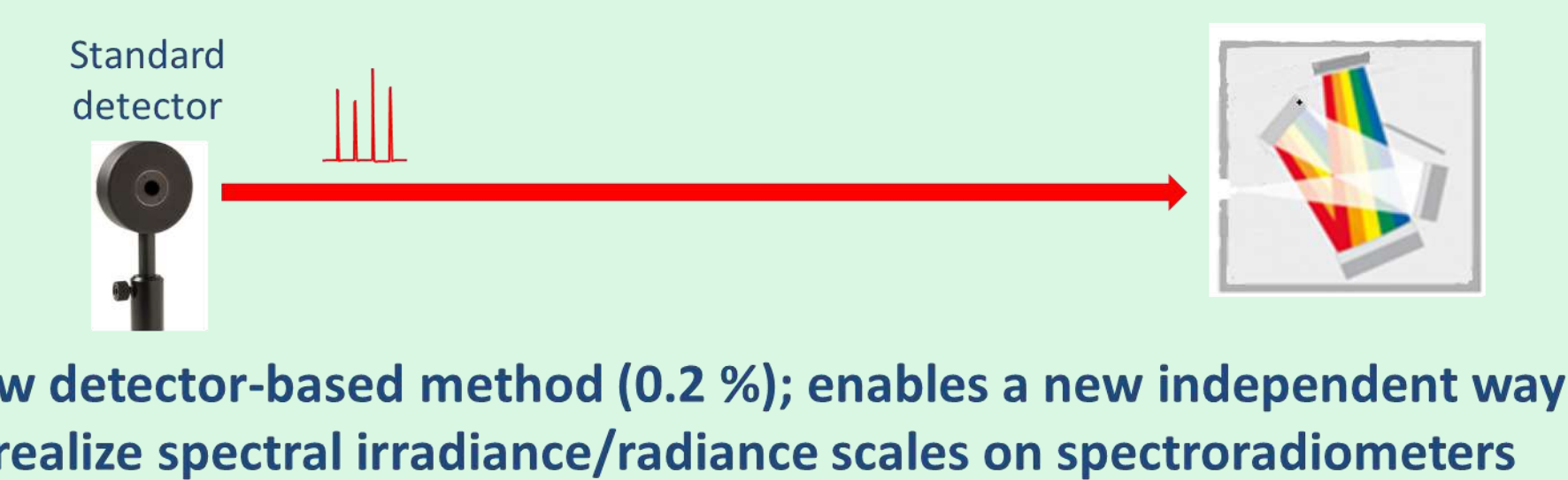
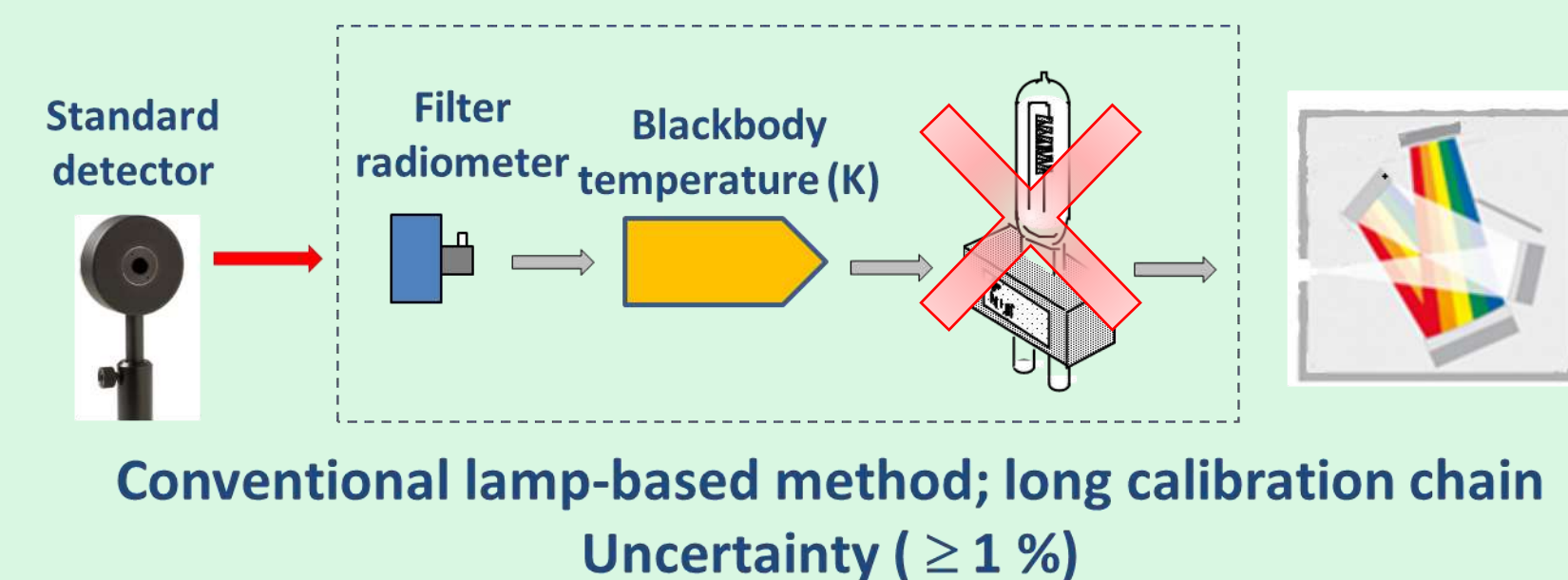
Storage test results



70 °C
75.0 %
200 h

Robustness Testing

New Scale Realization

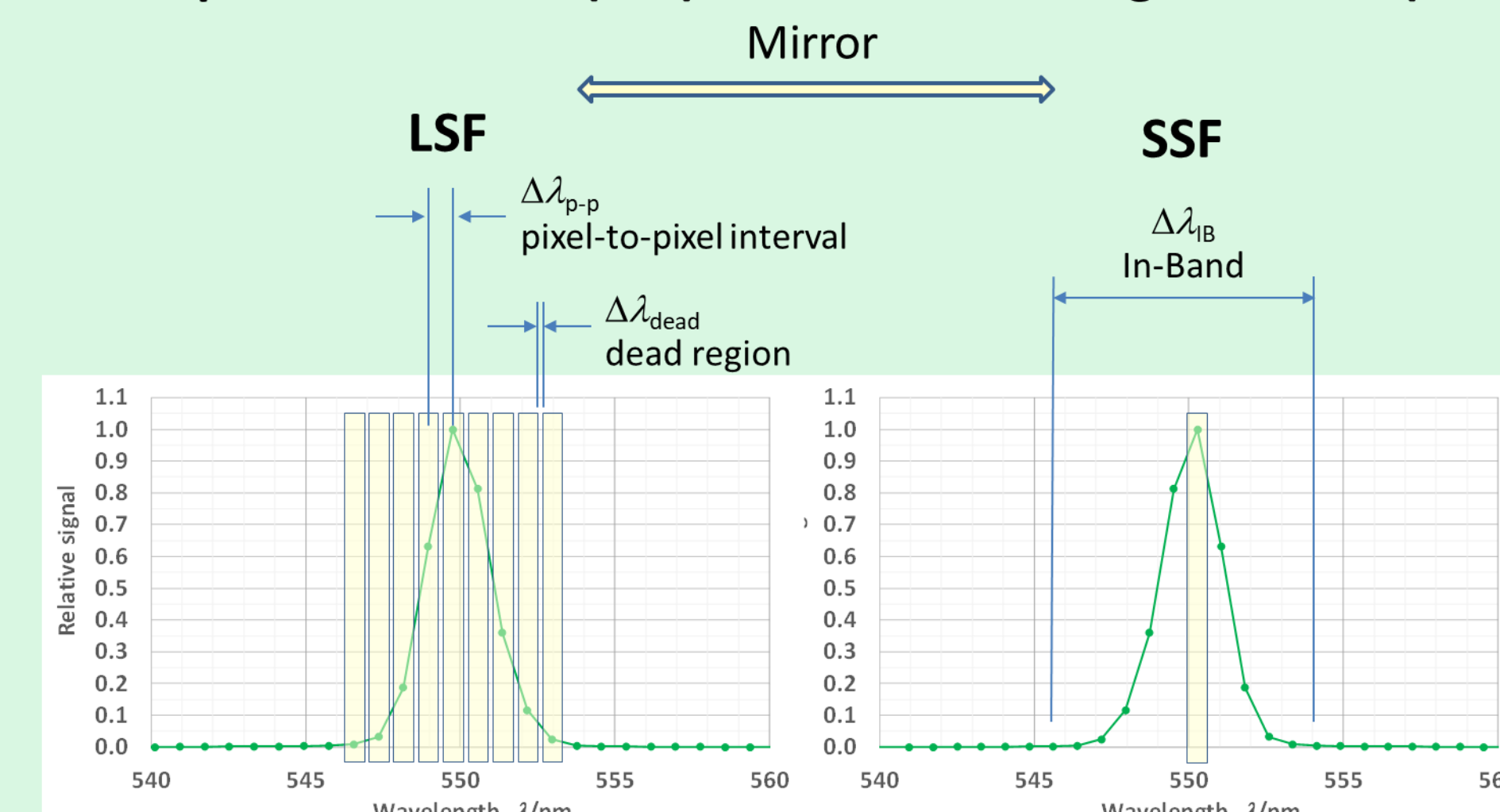


Simple stray light correction method for array
spectroradiometers and imaging systems

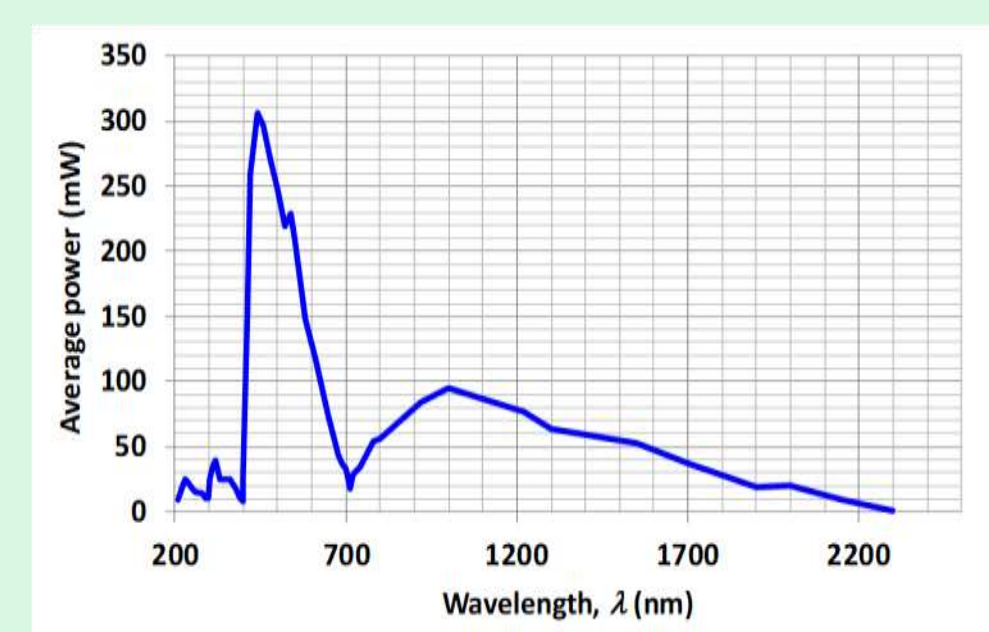


LED validation <0.05
% over a year

Line Spread Function (LSF) and Slit Scattering Function (SSF)



Compact tunable laser
facility for Candela
realization, calibrations,
and research

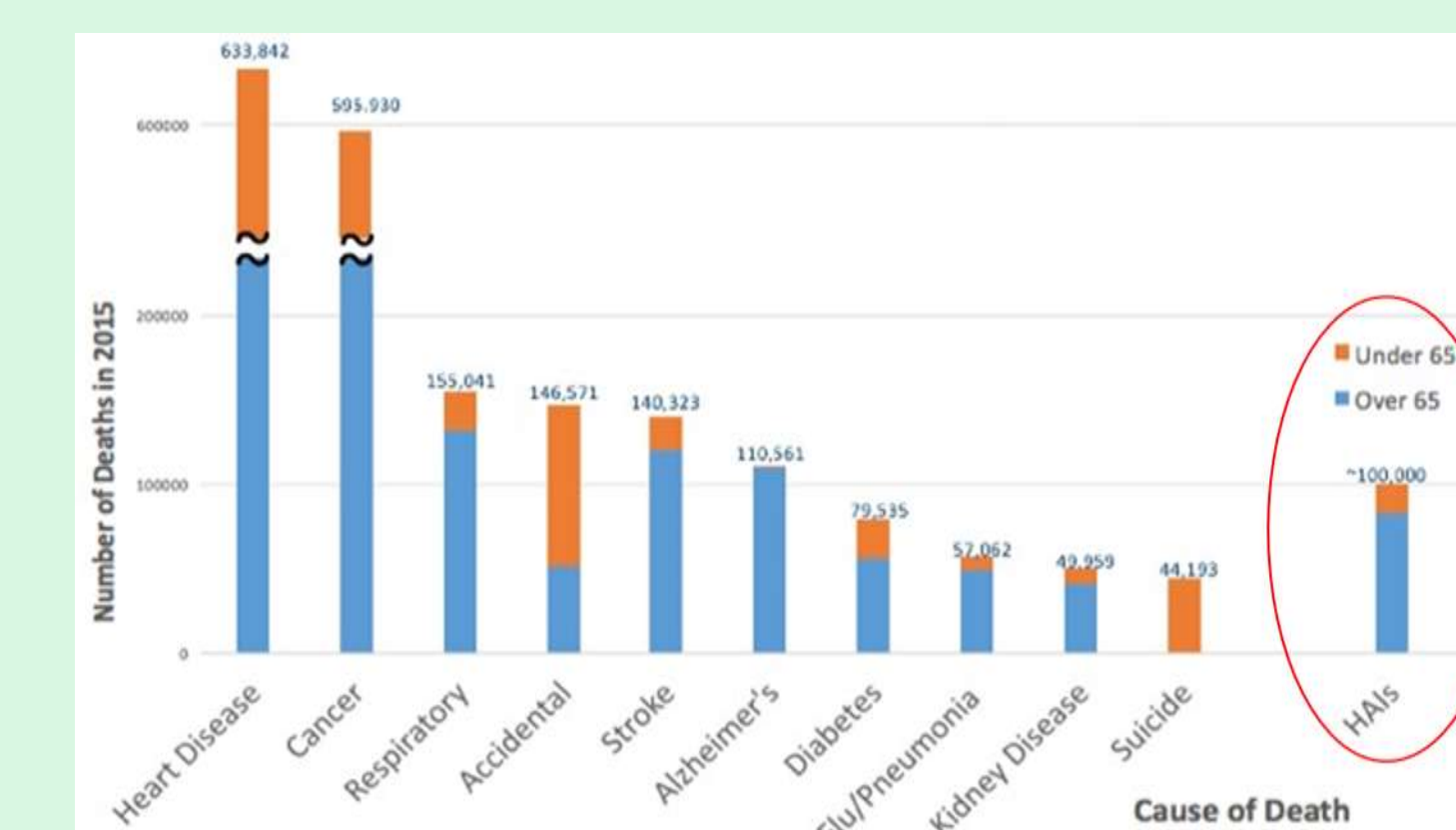


UV & IR LEDs



Visible White

1550 nm SWIR LED



One in every 25 Hospital Admissions
are infected with an HAI