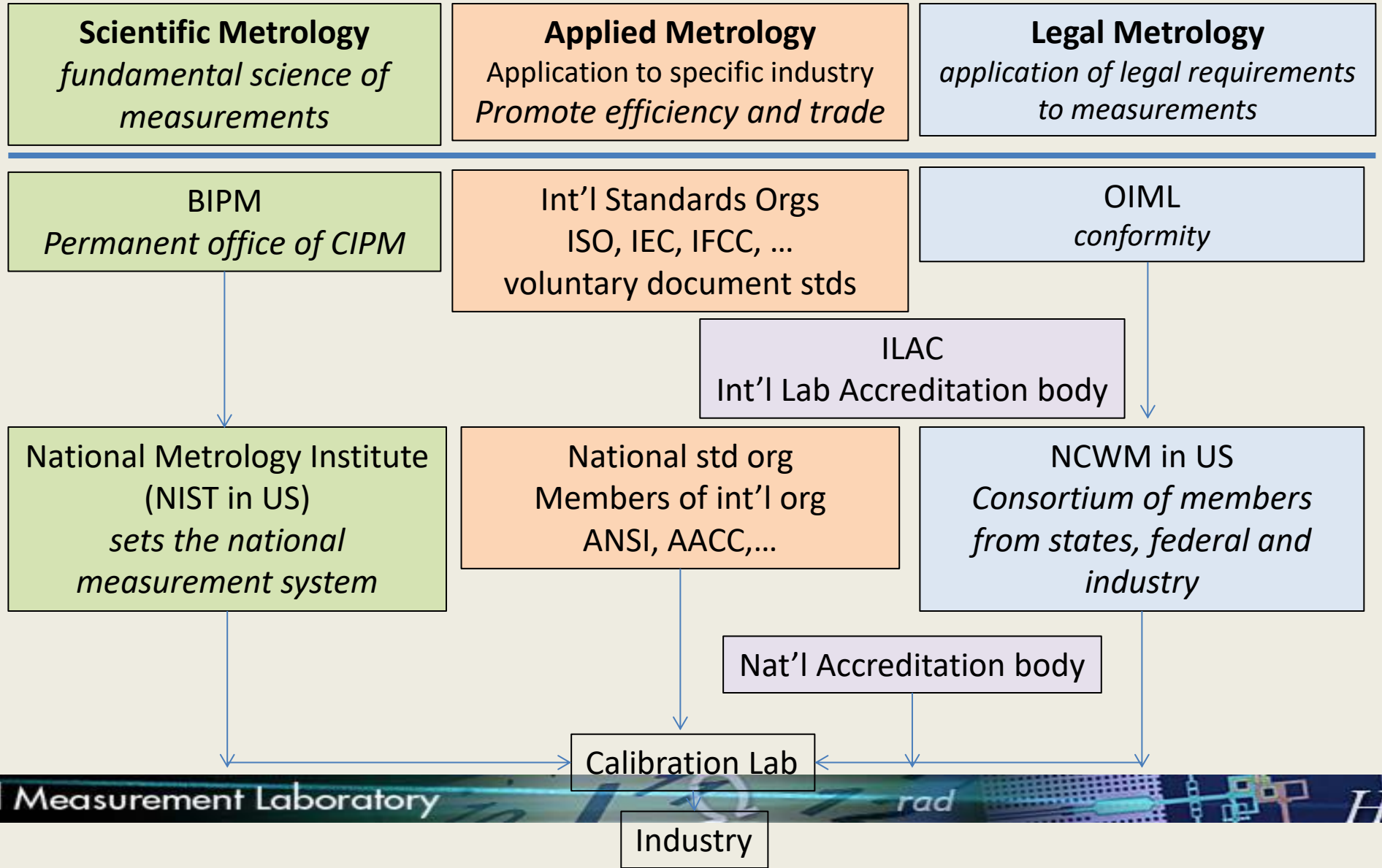
Optical Imaging Measurements and Traceability to the SI

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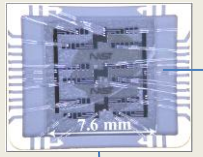
The World of Standards



SI Traceability of Light Measurements

h Planck constant
e elementary charge

Primary Resistance Standard



Resistors made of graphene based on quantum Hall effect

Primary standards defined only by h and e

Primary Volt Standard



Programmable Josephson Voltage Standard based on Josephson effect

Resistor

Ampere (Current)

Volt (Voltage)

Electrical Watt

NIST Primary Optical Watt Radiometer (POWR)



Optical Watt

Radiometric calibration to convert arbitrary units to physical units –where the challenge lies

Photons collected
ADU, AU, Counts, etc

light-based medical devices

Why Convert to Physical Units

Physical units are SI-traceable
Enables improvements to devices and methods
Allows comparisons across devices, time, locale, methodology
SI traceability is a global (and universal) system

