

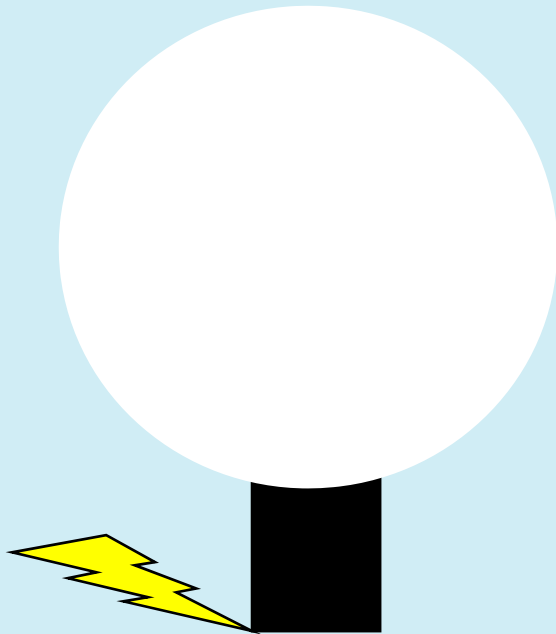


Technology Transition Workshop | *Brian Dalrymple*

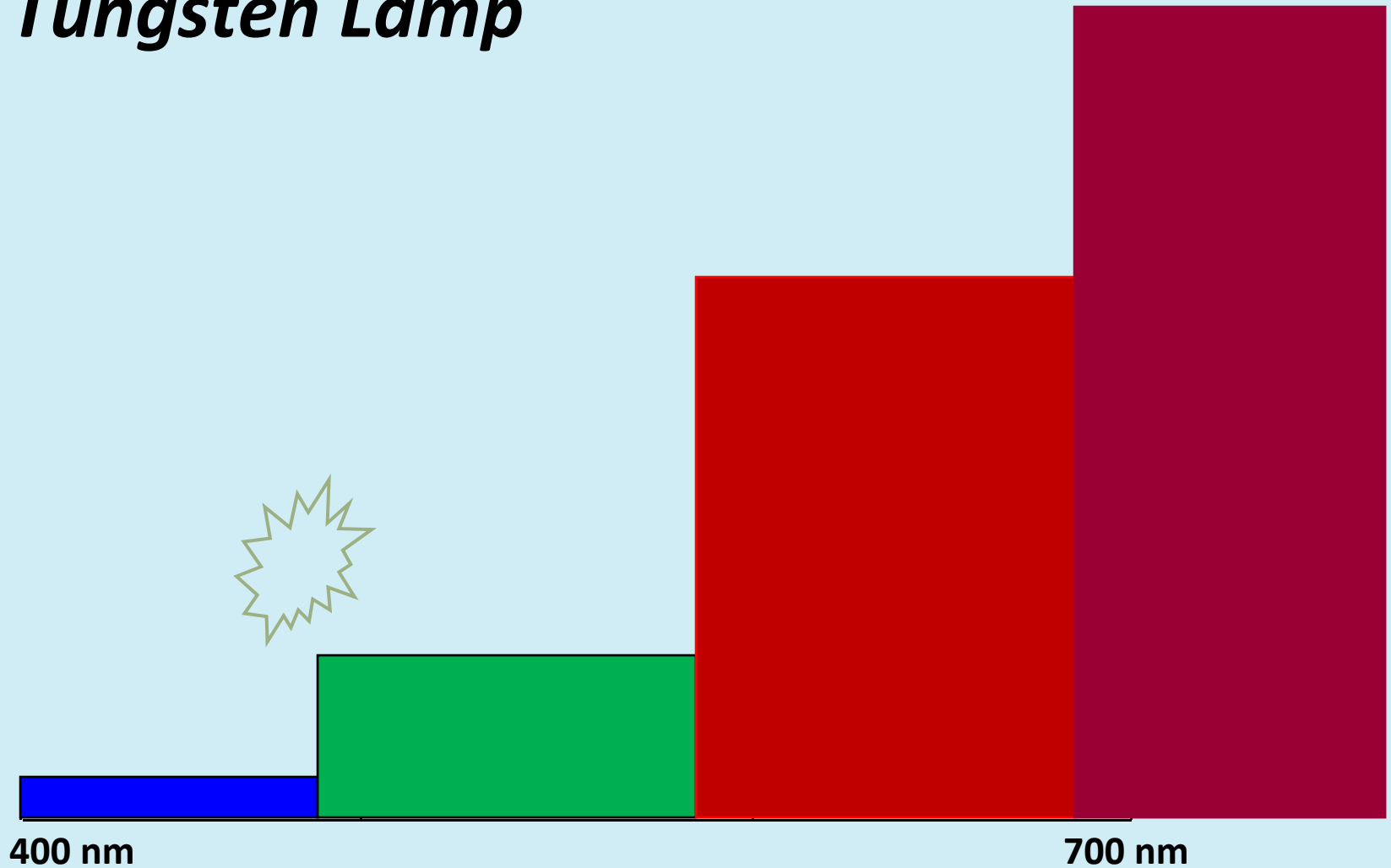
The Forensic Light Source – Comparisons

Point Source (Tungsten)

- ❖ Incandescent
- ❖ Random emission
- ❖ All directions
- ❖ All wavelengths



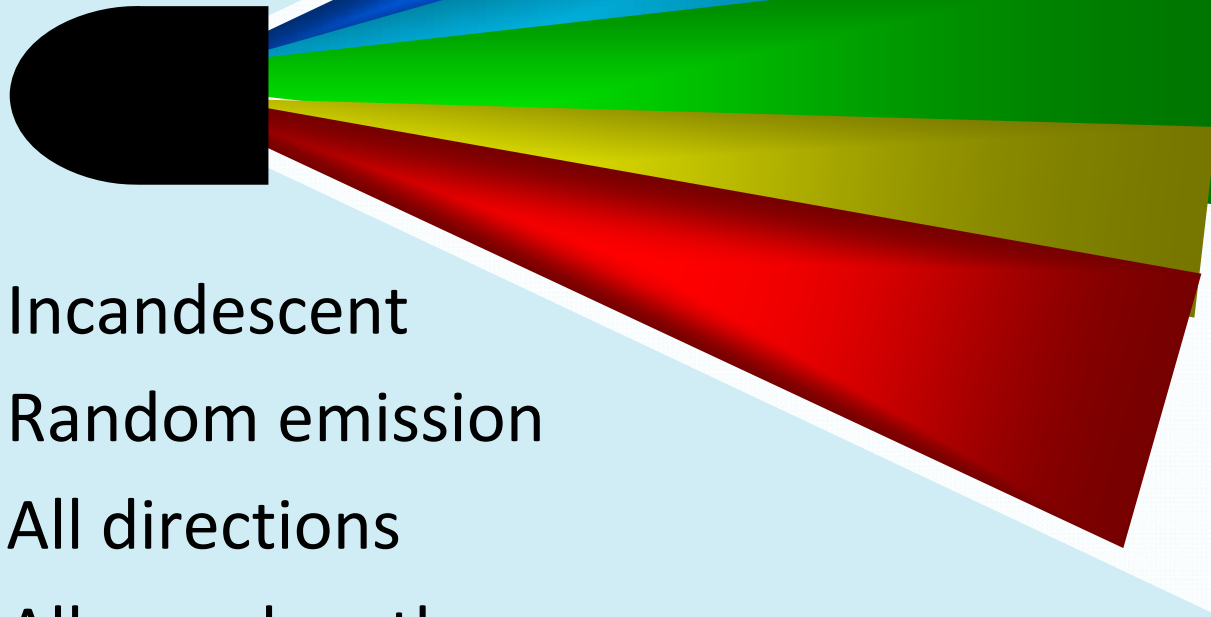
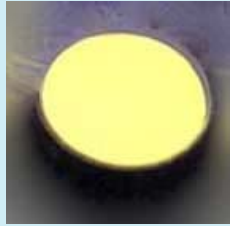
Tungsten Lamp



400 nm

700 nm

Tungsten



- ❖ Incandescent
- ❖ Random emission
- ❖ All directions
- ❖ All wavelengths

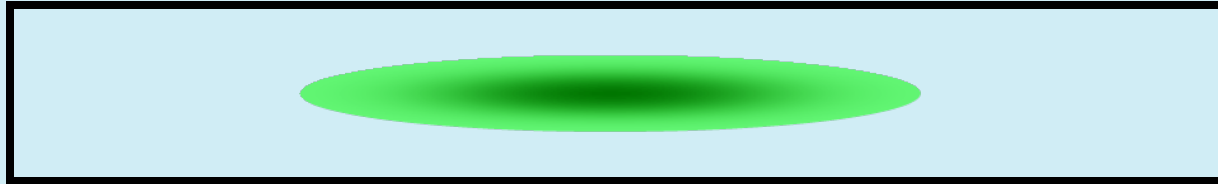
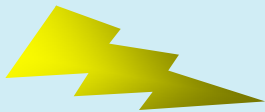
**LIGHT
AMPLIFICATION THROUGH
STIMULATED
EMISSION OF
RADIATION**

Argon Ion Laser

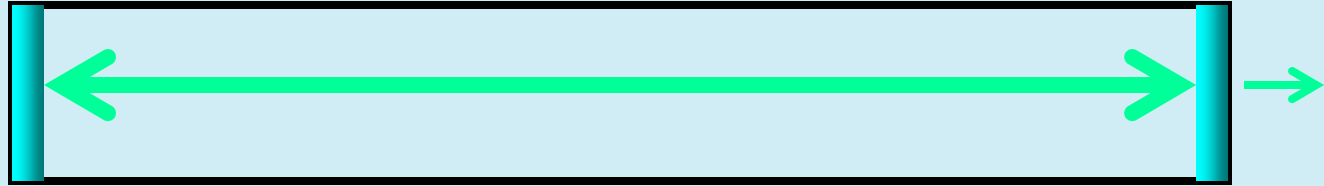
- ❖ Will detect untreated fingerprints
- ❖ Intrinsic fluorescence
- ❖ Expensive < 25K (70s dollars)
- ❖ 3-Phase power – 70 Amps/Phase
- ❖ Water-cooled
- ❖ Eye hazard
- ❖ Exhibit hazard
- ❖ High maintenance
- ❖ Not portable – no crime scenes

Argon Ion Laser

High voltage source



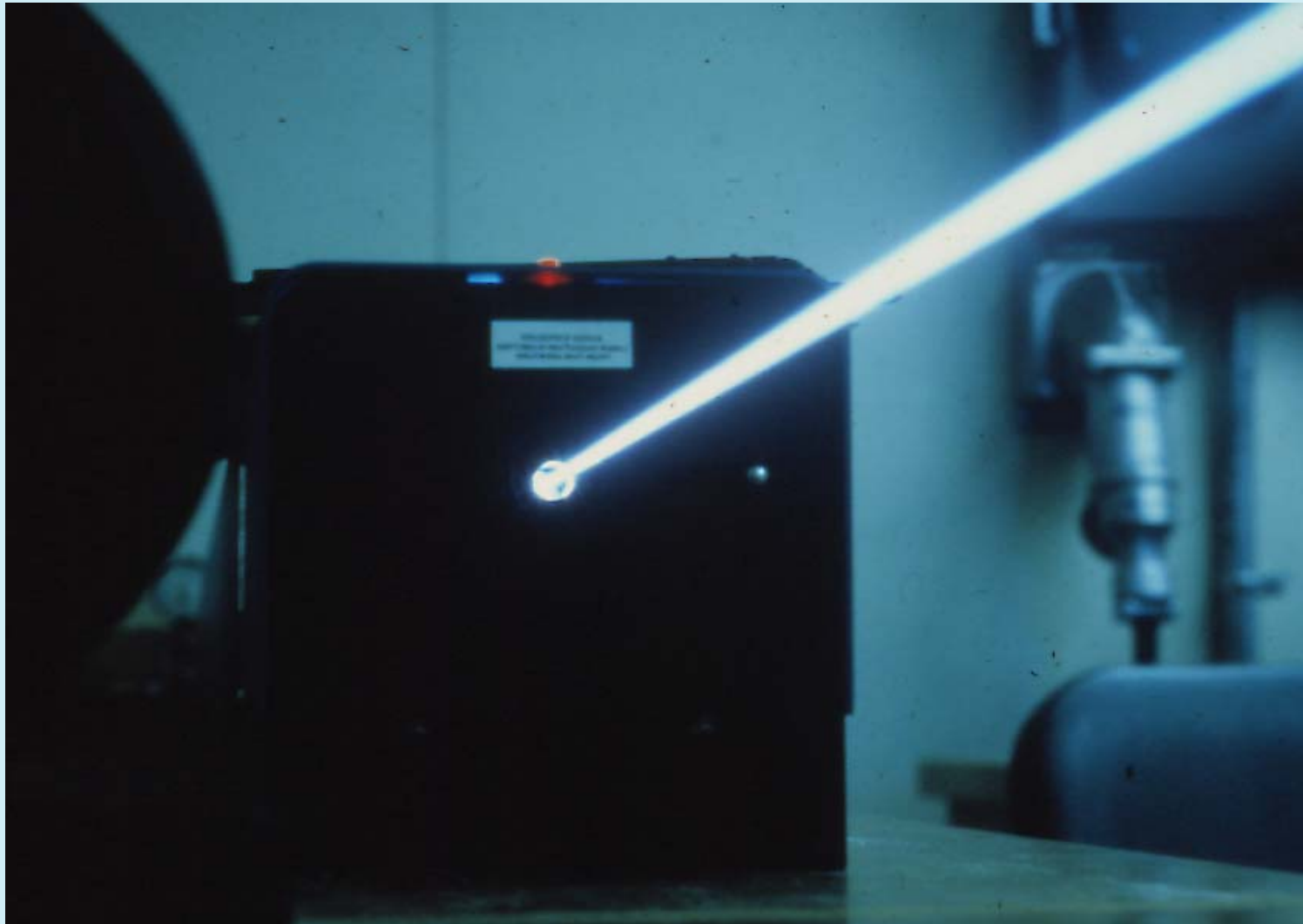
Argon Ion Laser



All-lines – 488 + 514.5 nm

Argon Laser – Pros

- ❖ Powerful
- ❖ Beam easily directed
- ❖ All blue-green lines
- ❖ No wasted or interfering light produced



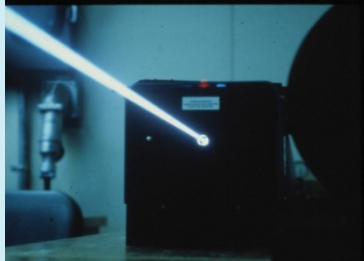
Technology
Transition Workshop



Argon Laser – Cons

- ❖ Expensive initial purchase
- ❖ Costly to run
 - 3-phase power
 - Water-cooled
- ❖ Requires expert maintenance
- ❖ Not portable
- ❖ Annoying coherent “speckle”

Laser



- ❖ Stimulated emission
- ❖ Coherent emission
- ❖ Straight line emission
- ❖ Monochromatic

Tungsten



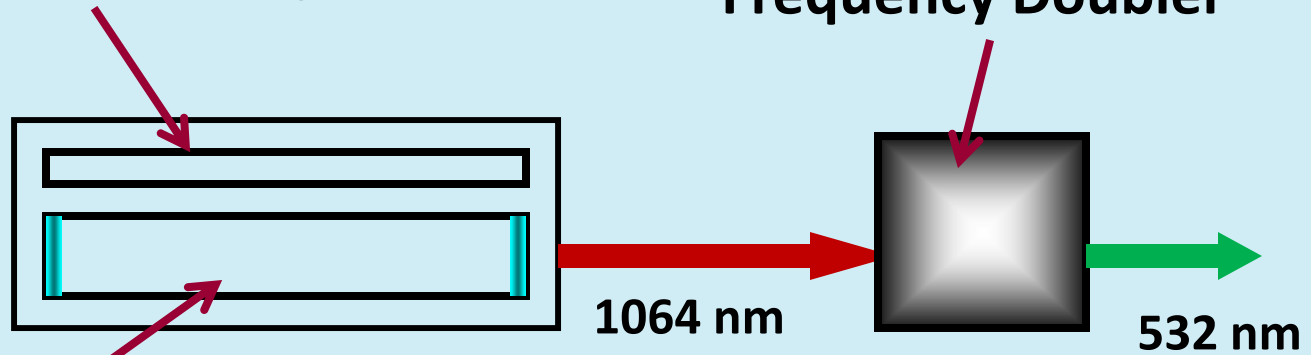
- ❖ Incandescent emission
- ❖ Random emission
- ❖ All directions
- ❖ All visible wavelengths

Frequency-Doubled Nd YAG Laser

Pumped Flashlamp

Frequency Doubler

Laser Rod



Frequency-Doubled Nd YAG Laser – Pros

- ❖ Powerful
- ❖ Durable
- ❖ Portable
- ❖ Air-cooled, 110V power
- ❖ Only green light
- ❖ No wasted light produced

Frequency-Doubled Nd YAG Laser – Cons

- ❖ Pulse laser
- ❖ Low repetition rate (16 Hz)
- ❖ Annoying, distracting

LED Sources

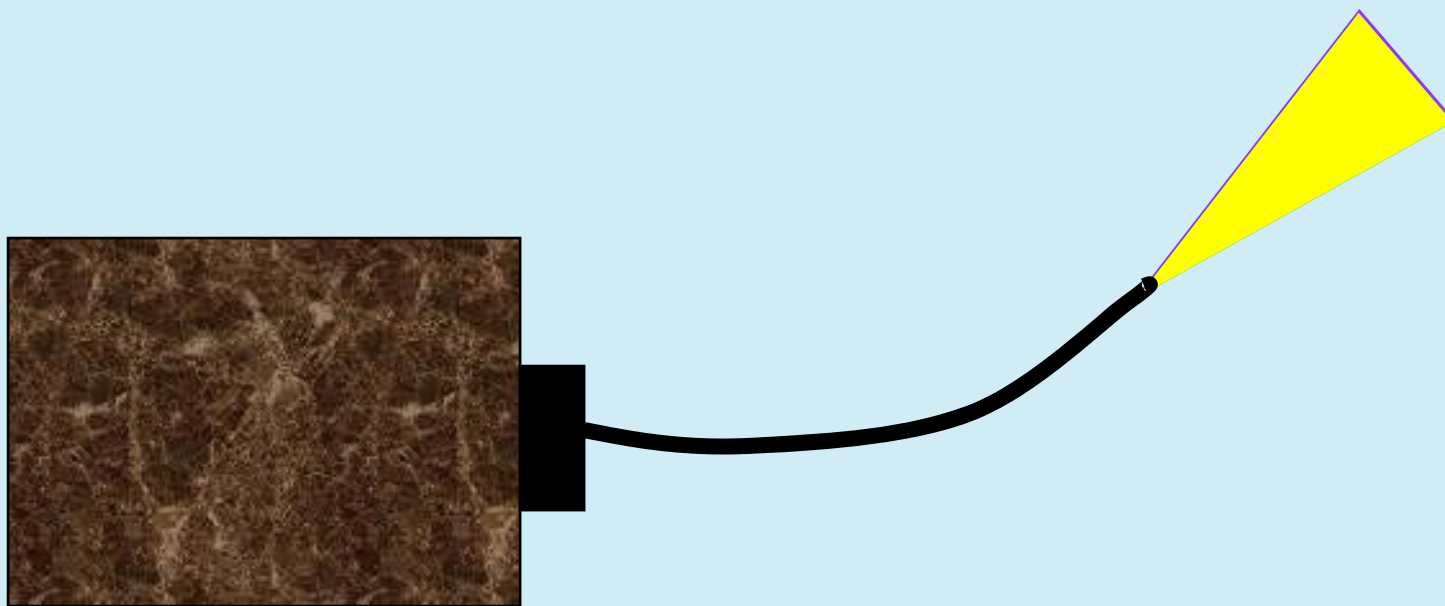
- ❖ Relatively cool
- ❖ Cheaper to run
- ❖ Low voltage
- ❖ Immune to vibration
- ❖ Long-lasting



Technology
Transition Workshop



Semiconductor Laser



Alternative

Light

Source?

YAG, OPSC Lasers & LEDs



Spectrum courtesy of Rofin

Forensic

Light

Source!

Saliva

Laser

WHITE VINYL

LED 450

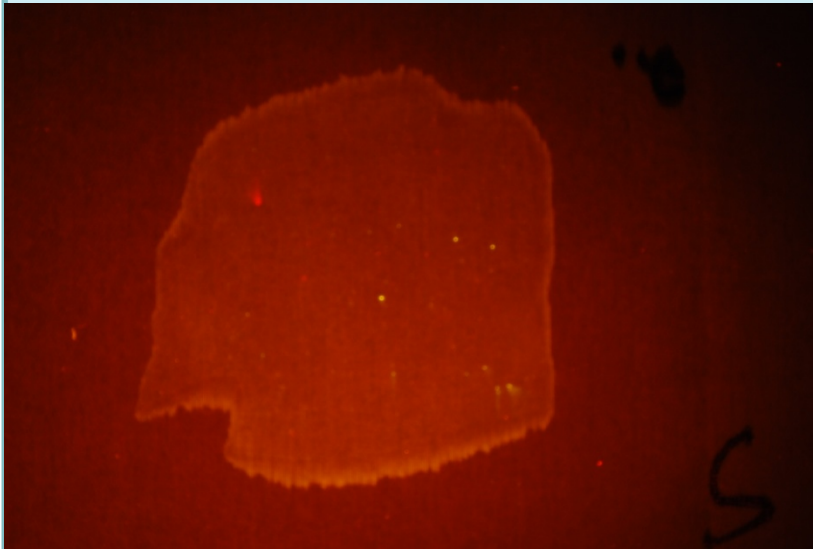


Semen

Laser

WHITE CLOTH

LED 450

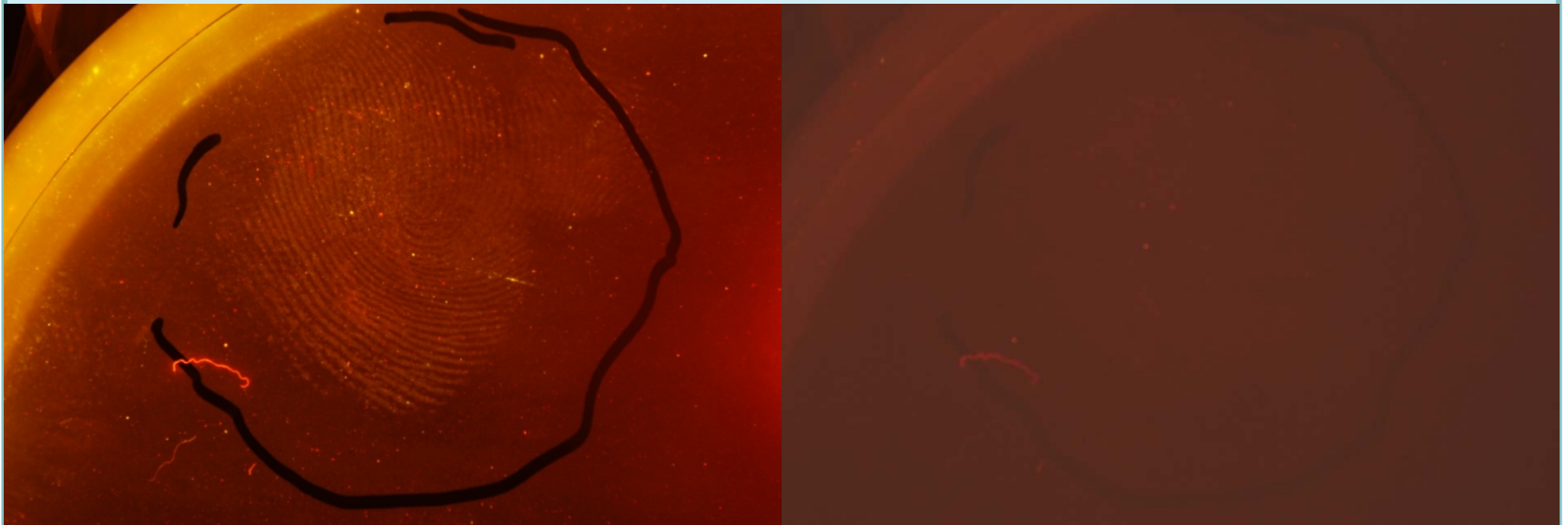


Untreated Fingerprints

Laser

WHITE BAG

LED 505



Untreated Fingerprints

Laser



POLILIGHT® 505

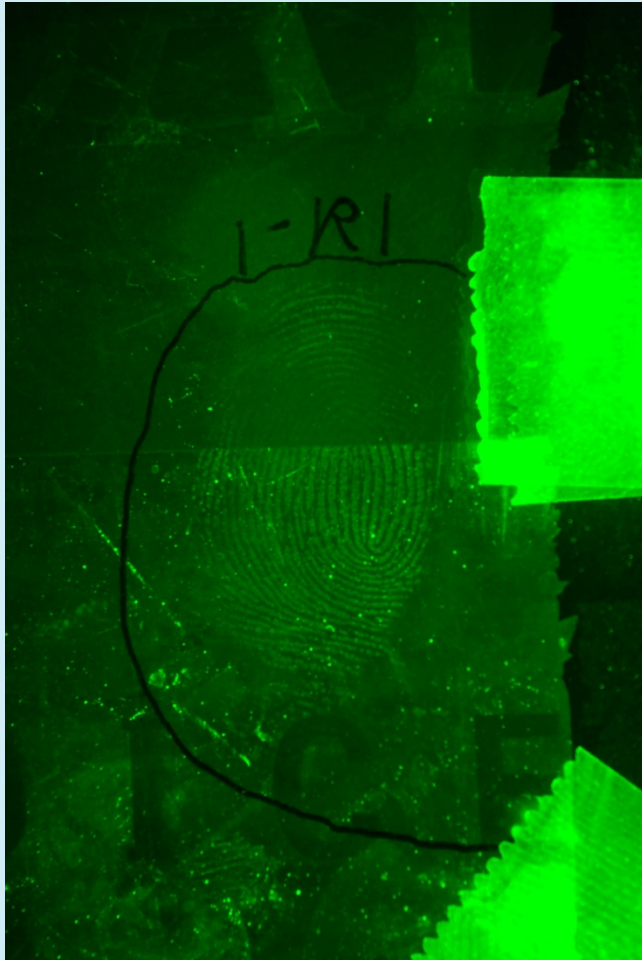


Technology
Transition Workshop

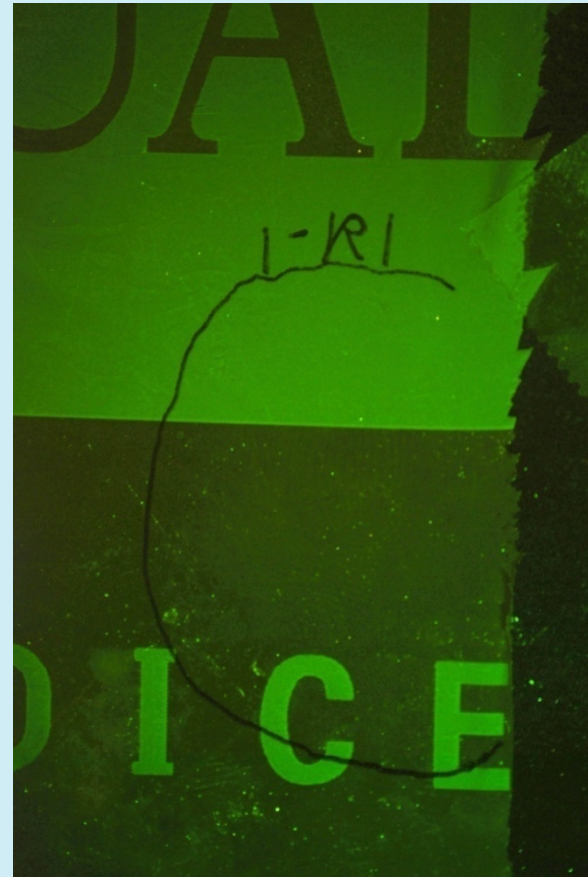


Untreated Fingerprints

Laser



POLILIGHT® 505

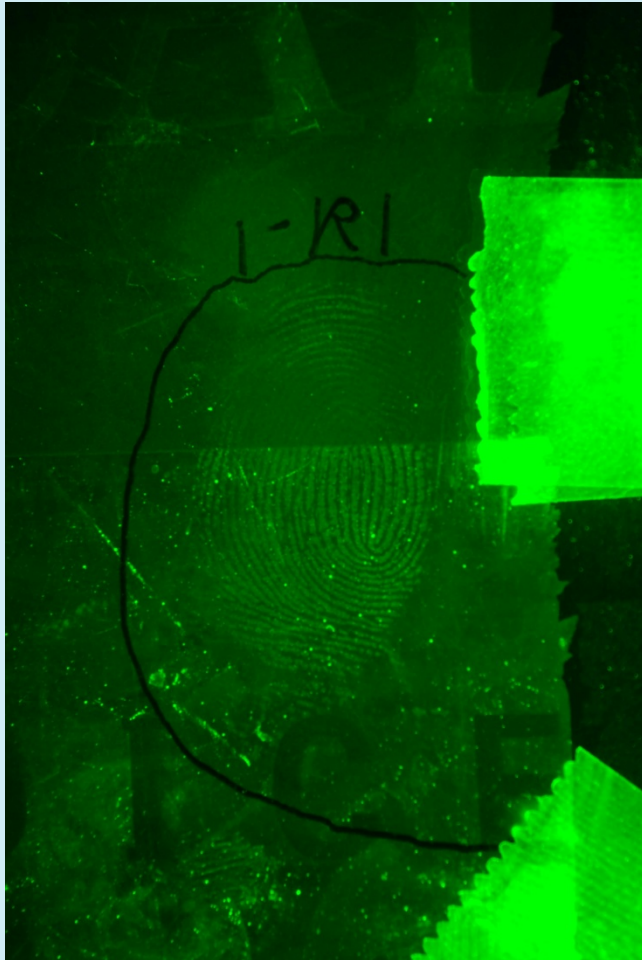


Technology
Transition Workshop



Untreated Fingerprints

Laser



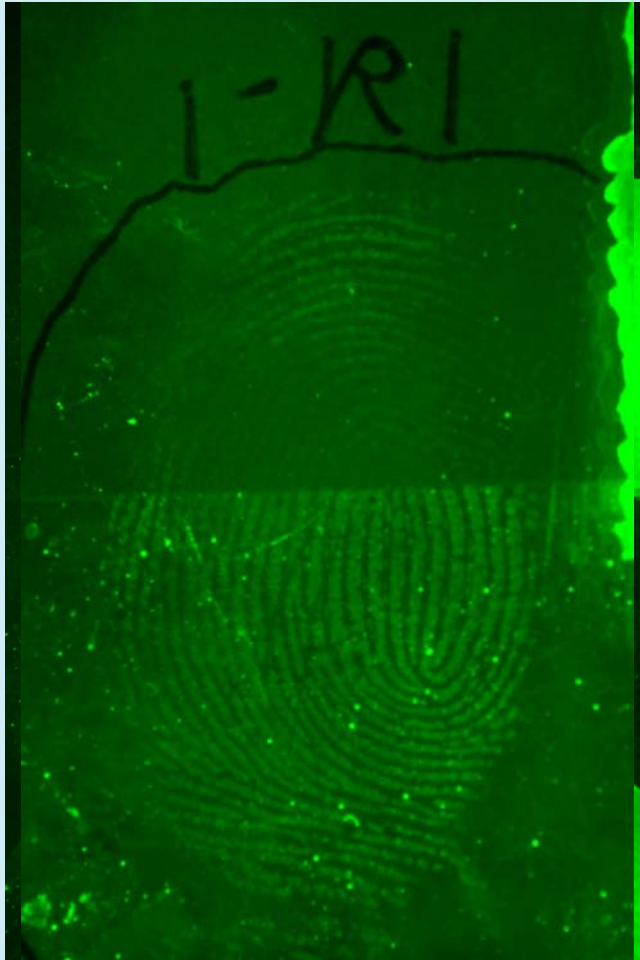
POLILIGHT® 505



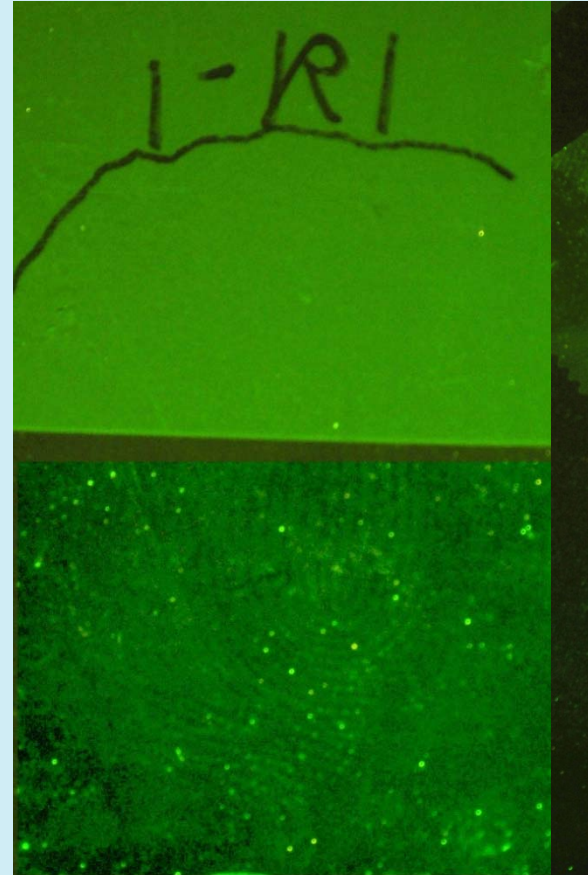
Technology
Transition Workshop 

Untreated Fingerprints

Laser



POLILIGHT® 505



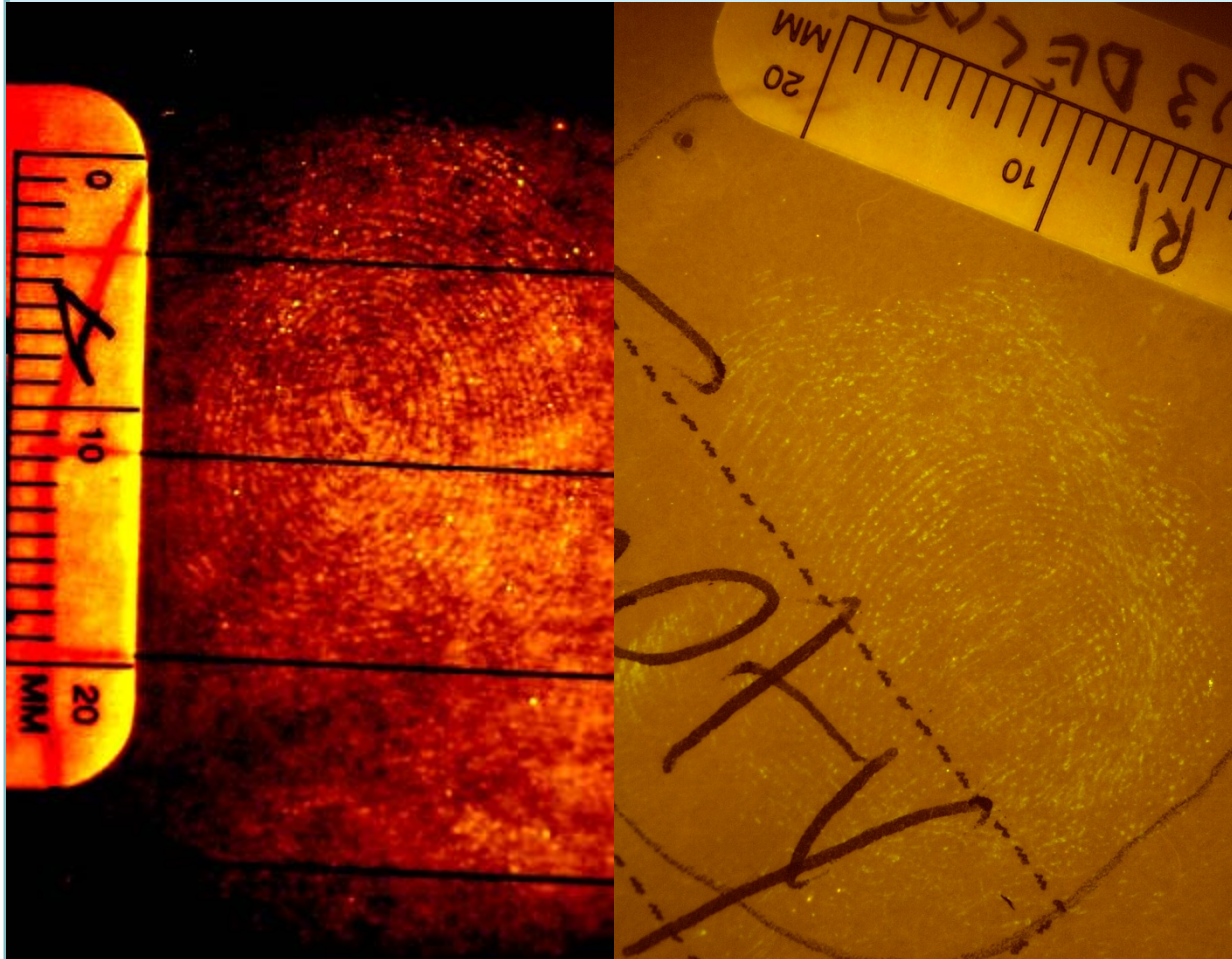
Technology
Transition Workshop 

Untreated Fingerprints ***POLILIGHT® 505***



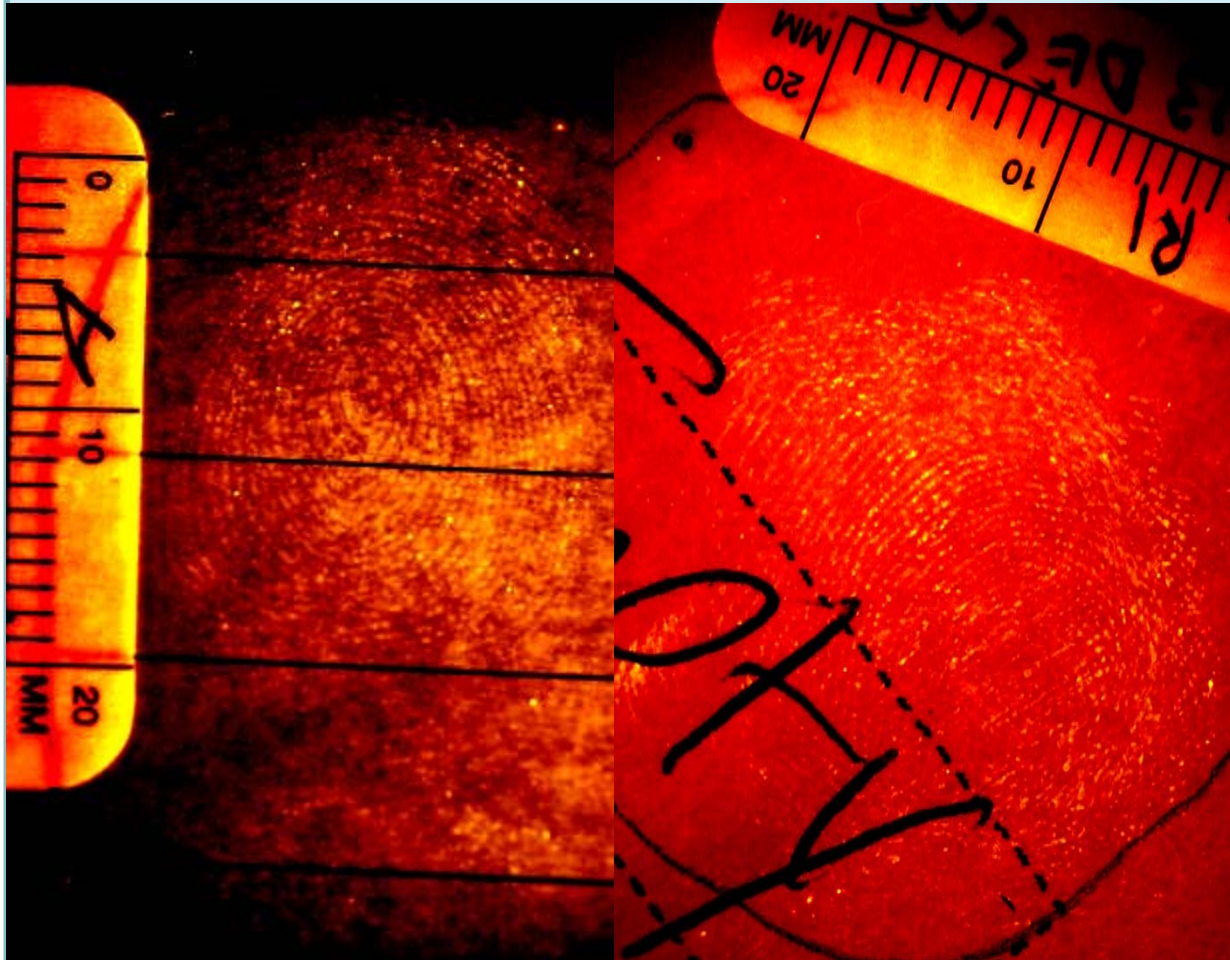
Untreated Fingerprints

POLILIGHT® 505



Untreated Fingerprints

POLILIGHT® 505

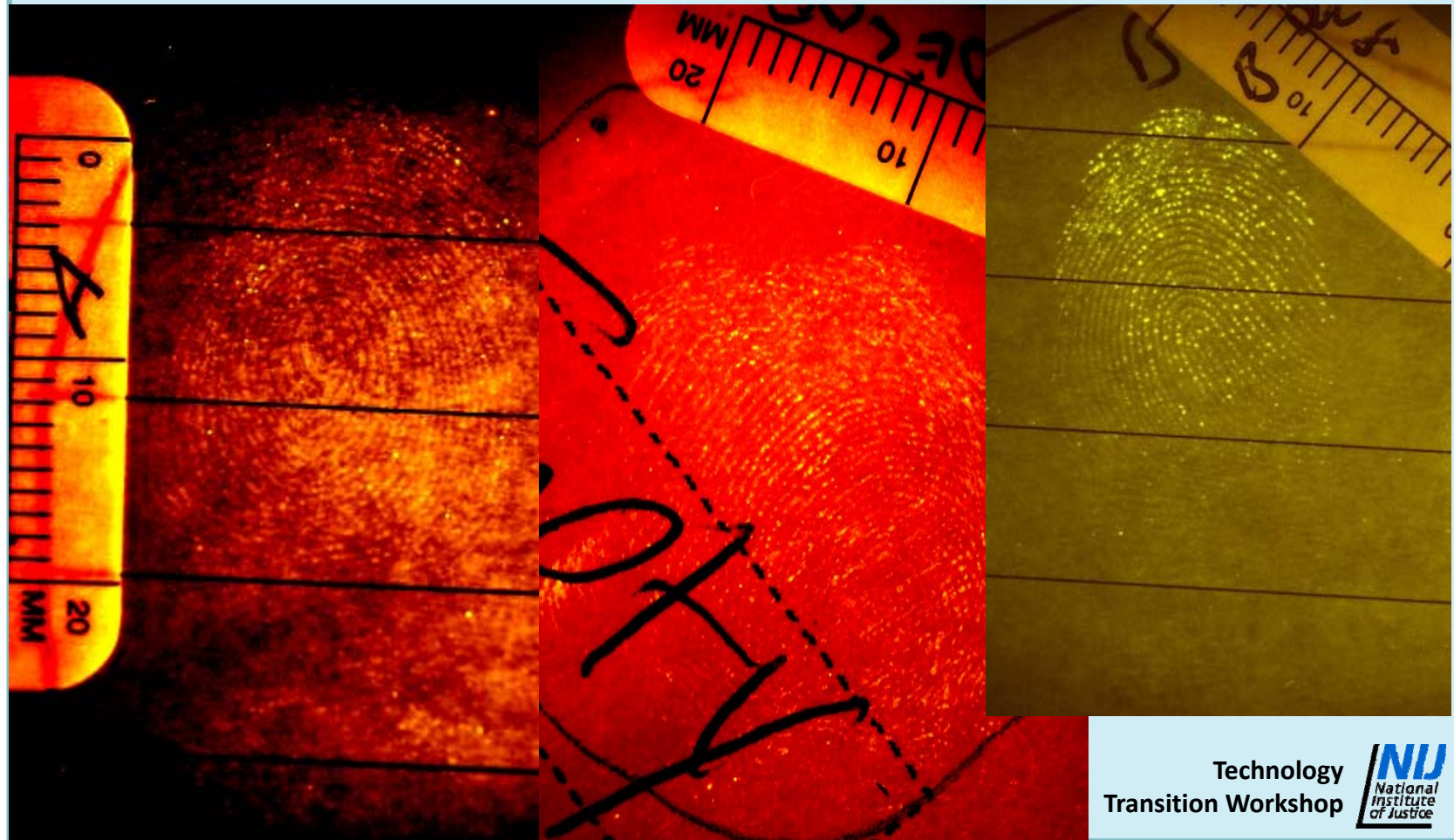


Technology
Transition Workshop



Untreated Fingerprints

POLILIGHT® 505

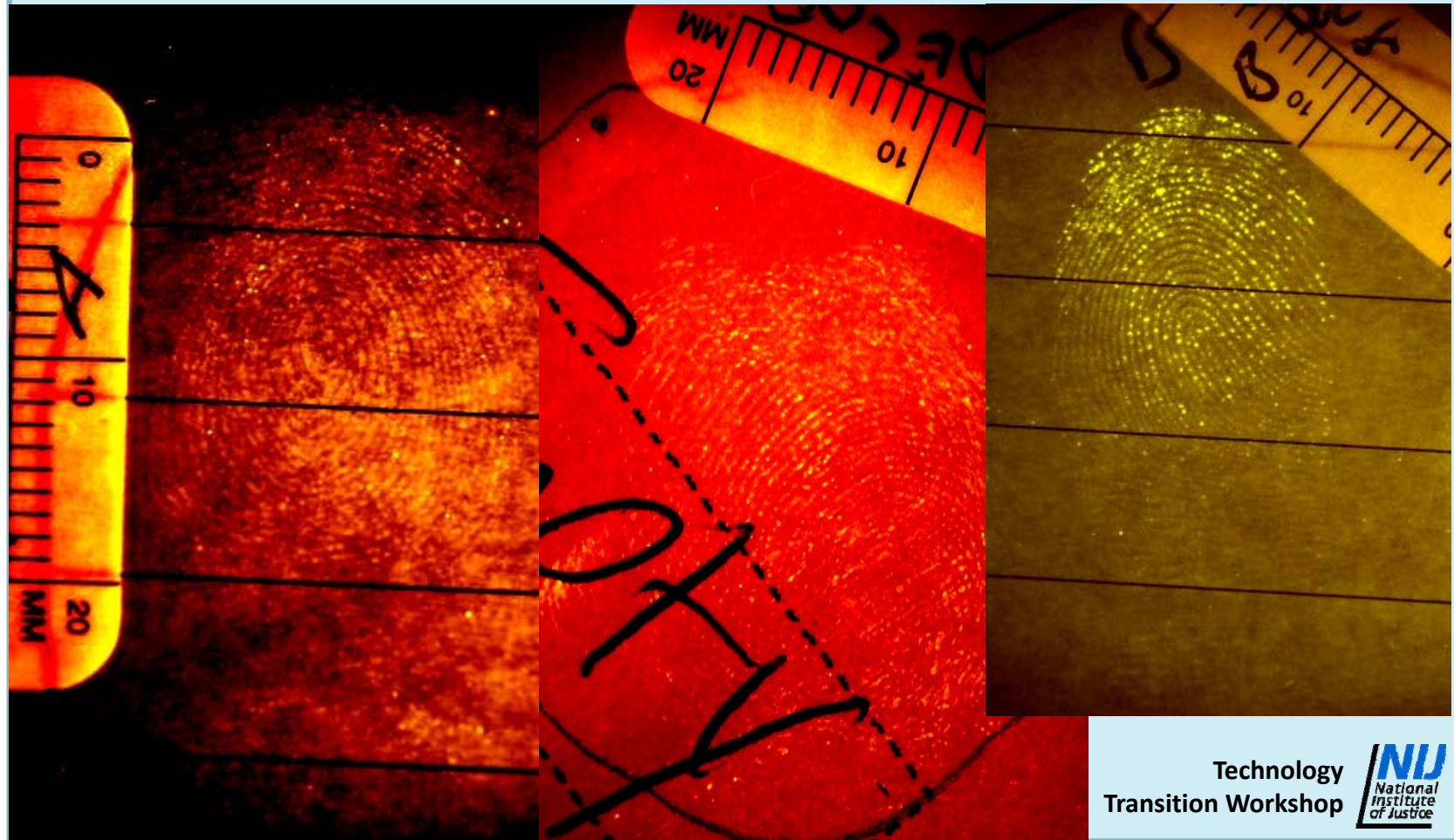


Technology
Transition Workshop



Untreated Fingerprints

POLILIGHT® 505

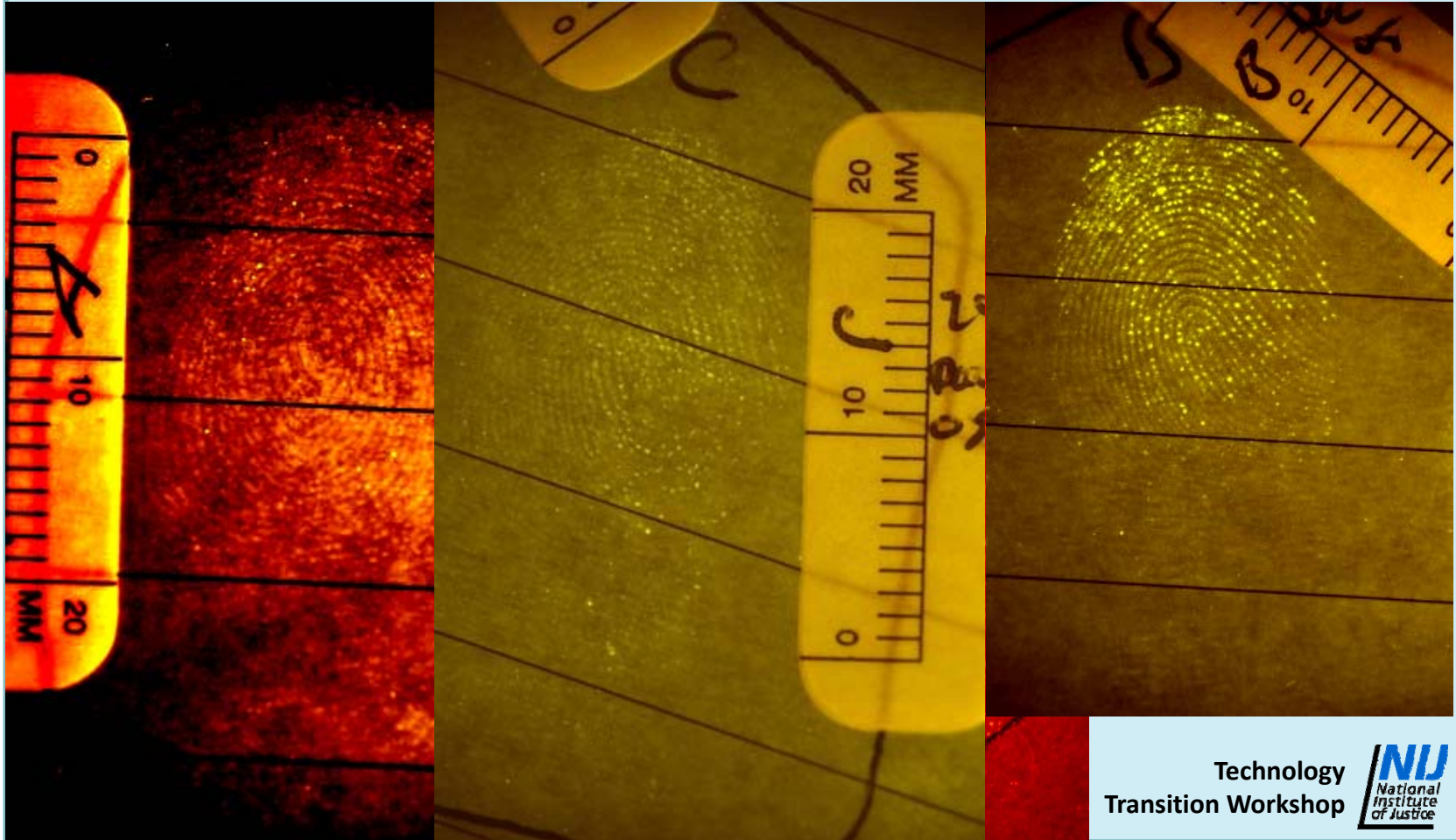


Technology
Transition Workshop



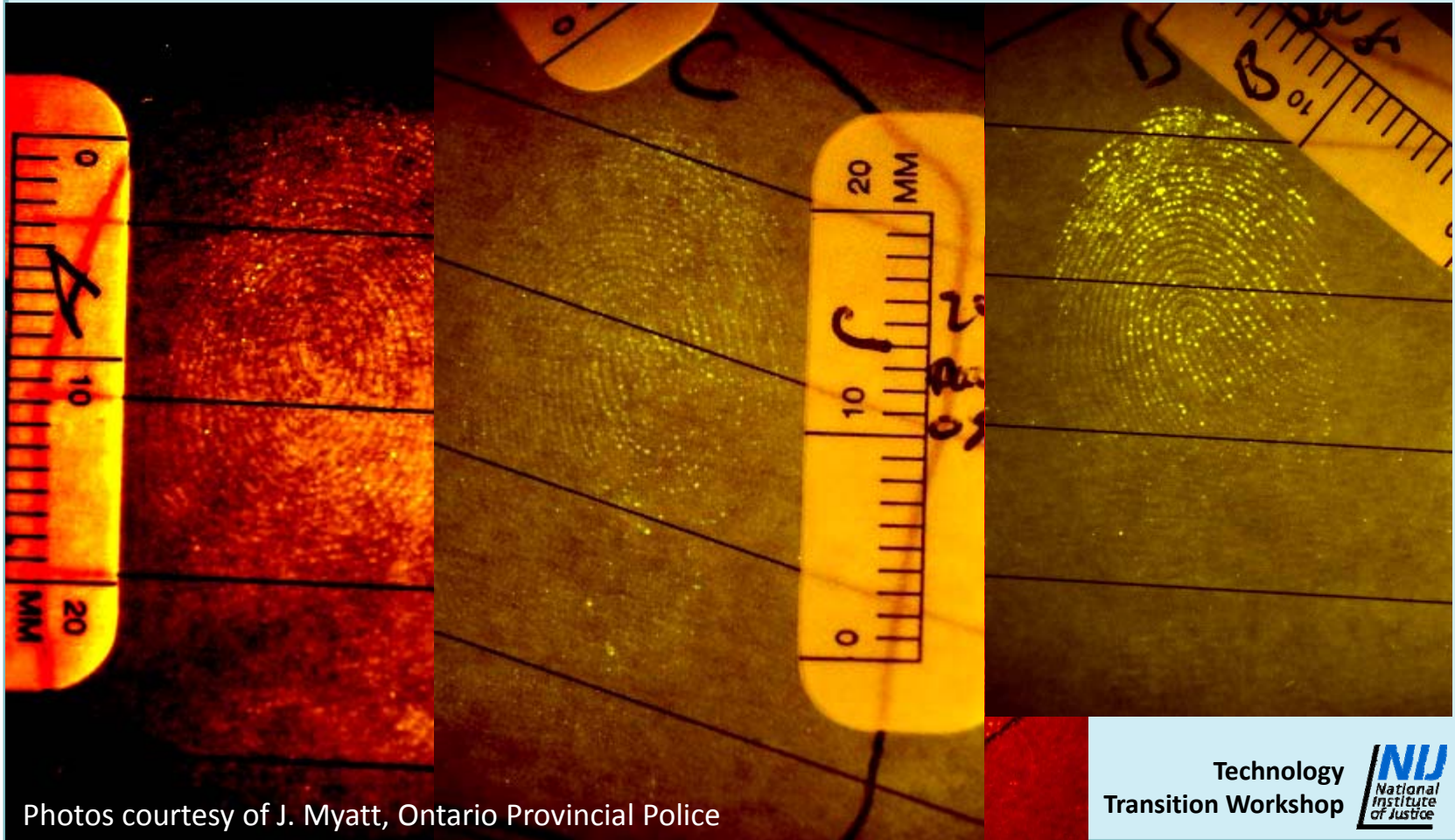
Untreated Fingerprints

POLILIGHT® 505



Untreated Fingerprints

POLILIGHT® 505



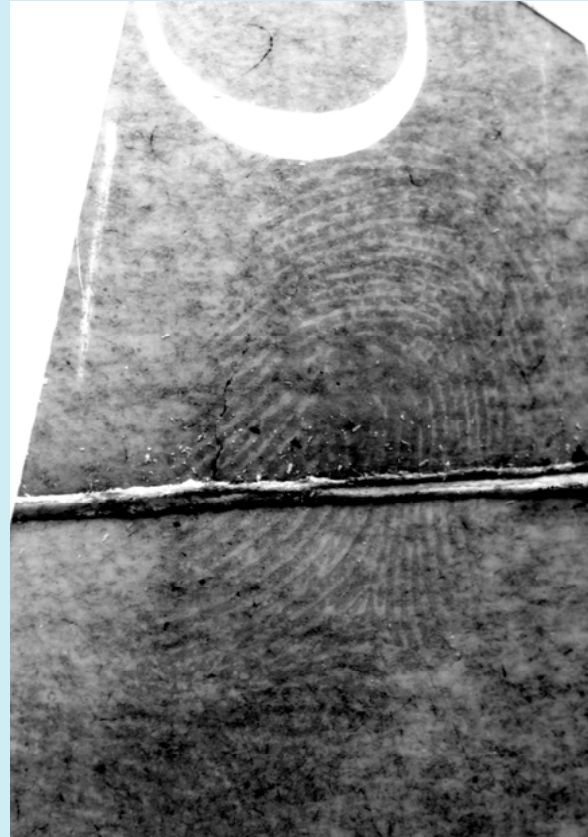
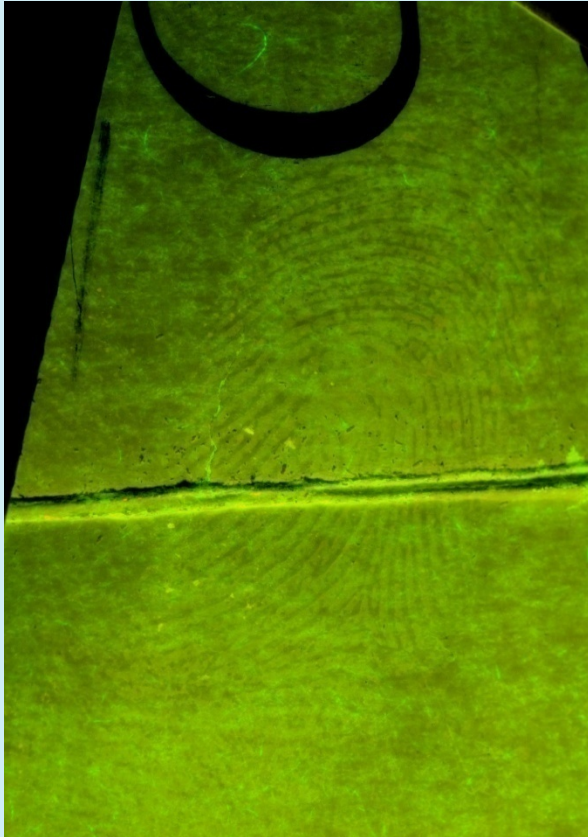
Photos courtesy of J. Myatt, Ontario Provincial Police

Technology
Transition Workshop



Untreated Fingerprints

POLILIGHT® 360 – Yellow Filter



Photos courtesy of J. Myatt, Ontario Provincial Police

Technology
Transition Workshop



Options

LASER



FILTERED LAMP



LED

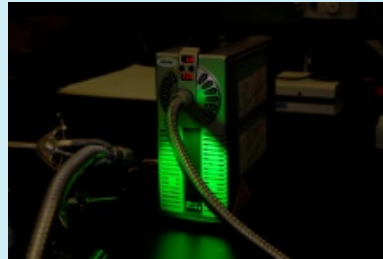


Options

LASER



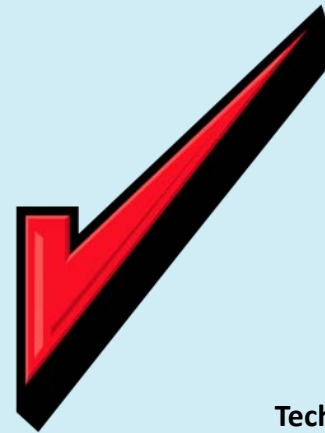
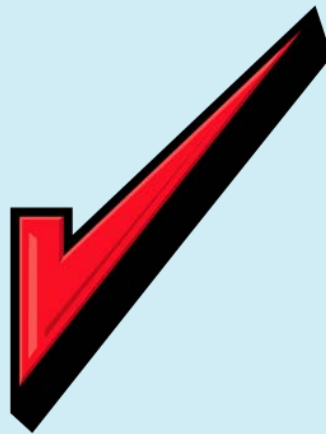
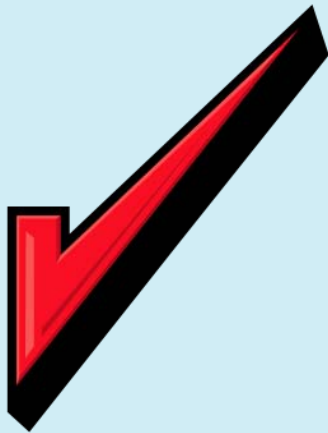
FILTERED LAMP



LED



Body Fluids

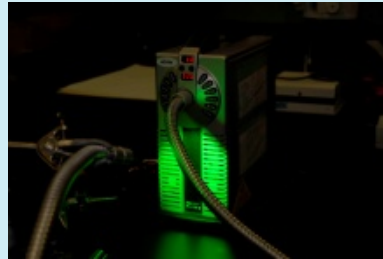


Options

LASER



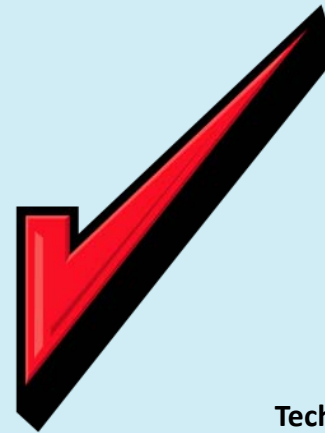
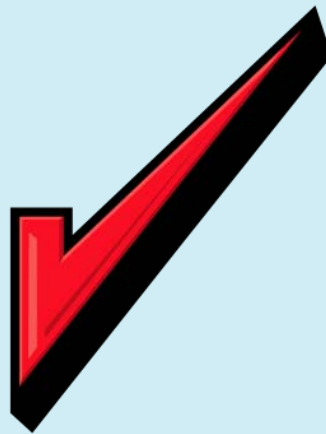
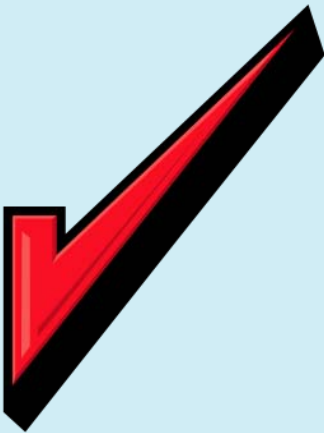
FILTERED LAMP



LED



Rhodamine 6G

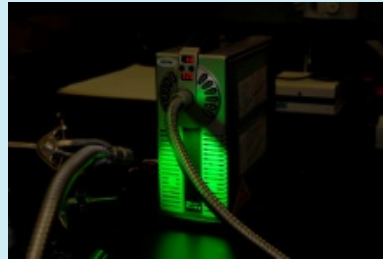


Options

LASER



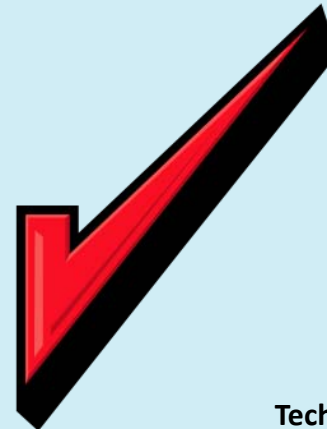
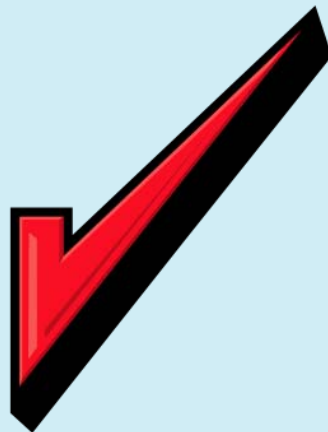
FILTERED LAMP



LED



Brilliant Yellow

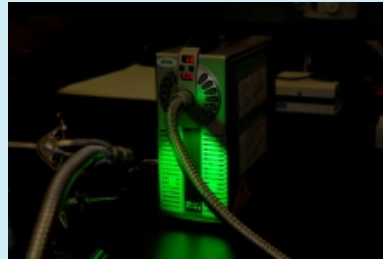


Options

LASER



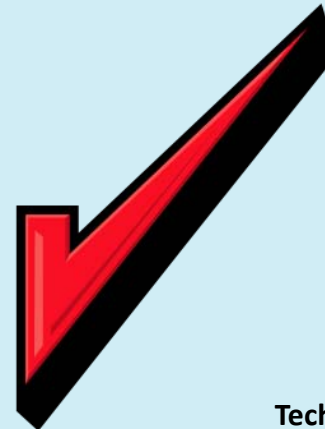
FILTERED LAMP



LED



DFO

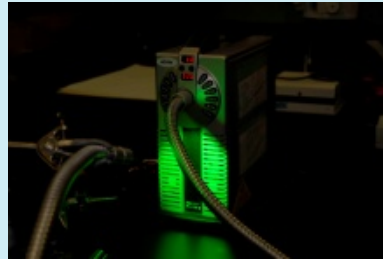


Options

LASER



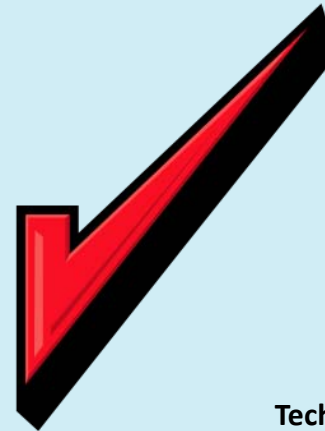
FILTERED LAMP



LED



Indanedione

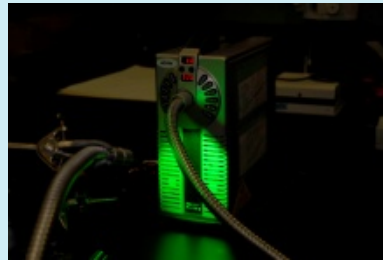


Options

LASER



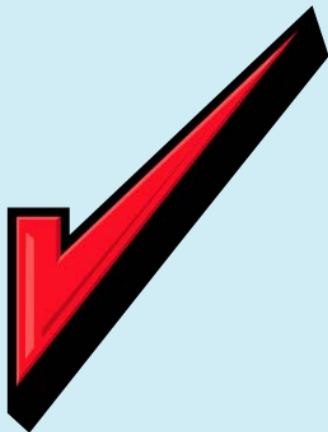
FILTERED LAMP



LED



Untreated Prints



Technology
Transition Workshop

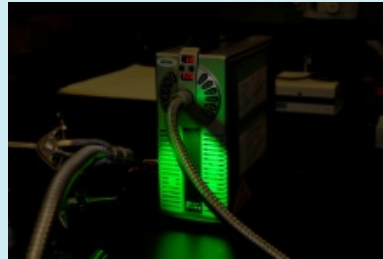


Options

LASER



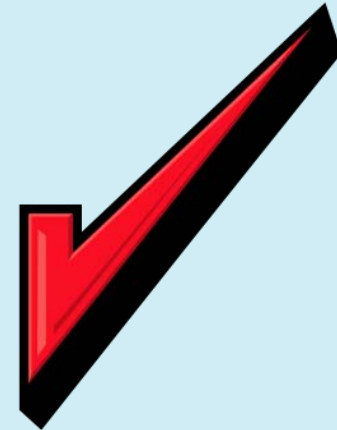
FILTERED LAMP



LED



Portability

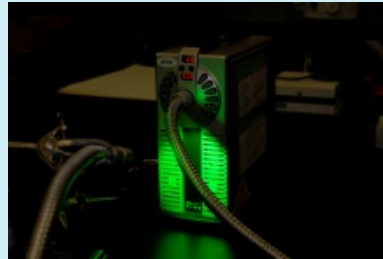


Options

LASER



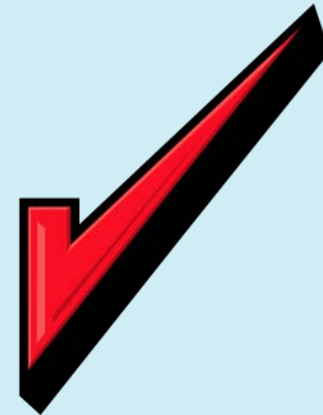
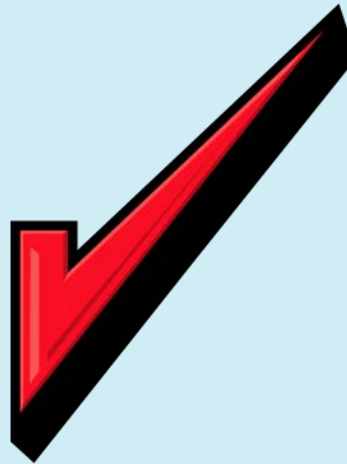
FILTERED LAMP



LED



Photography

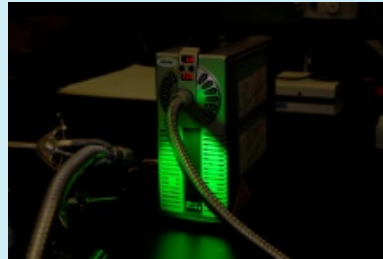


Options

LASER



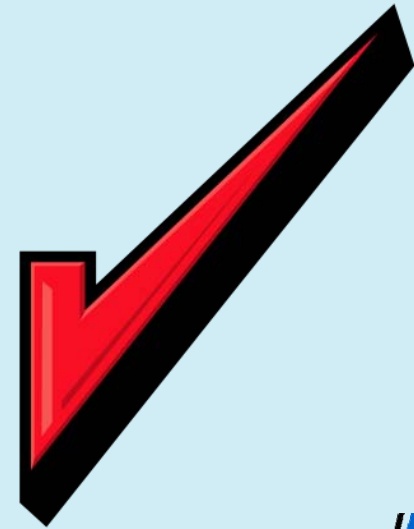
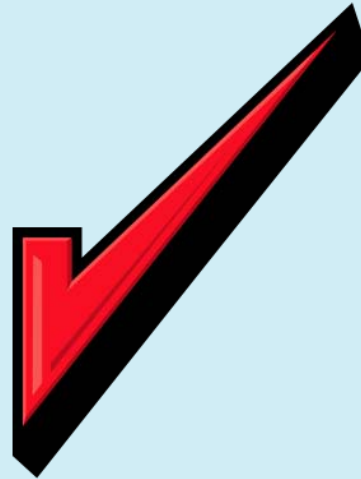
FILTERED LAMP



LED



Ease of Use

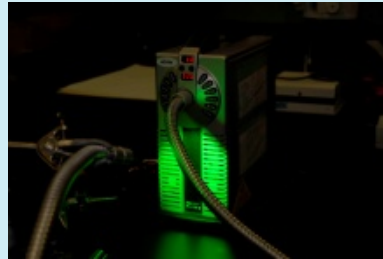


Options

LASER



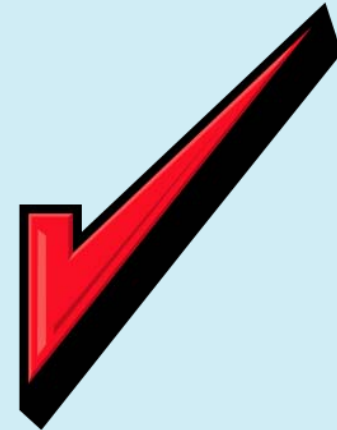
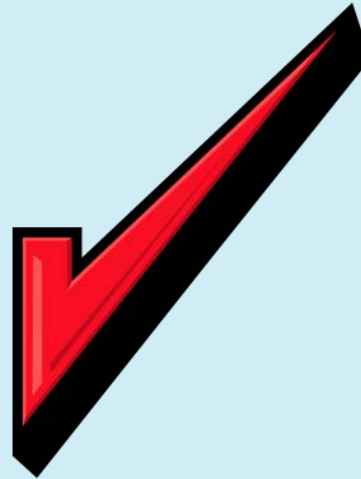
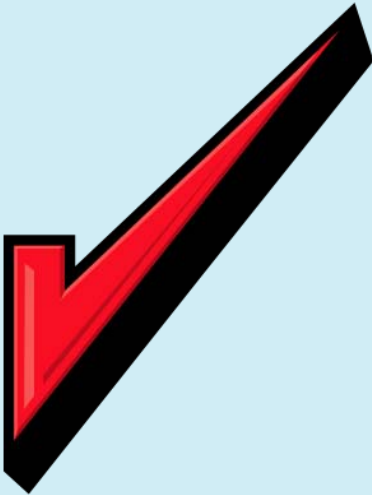
FILTERED LAMP



LED



Reliability



Summary

- ❖ All choices offer clean uniform light
- ❖ All choices work very well with chemistry
- ❖ Lasers are the most sensitive for untreated prints
- ❖ Fibers may be revealed differently
- ❖ Differences between target and substrate
- ❖ Lamps and LEDs more versatile
- ❖ All choices work well on location and in lab
- ❖ All choices require clamp for photography
- ❖ Lasers and LED operate on battery power

Inconvenient Truth

- ❖ Lasers are monochromatic
- ❖ Lamps and LEDs are broadband
- ❖ They do many of the same tasks
- ❖ They don't do exactly the same things
- ❖ Each has the ability to find things the other misses
- ❖ If we don't use both, we may miss evidence

Conclusion

- ❖ Dollar dependent
- ❖ Not dollar driven
- ❖ Event driven
- ❖ The right techniques for the right reasons
- ❖ The right equipment for the right reasons
- ❖ True economy:
 - Doing it right the first time

Questions?

Contact Information

Brian Dalrymple
PO Box 296, Orillia ON L3V 6J6
Canada
Tel. 705-835-0227
info@briandalrymple.com

Note: All images are courtesy of Brian Dalrymple unless otherwise noted.