Global Laser Update

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IN TWO YEARS' TIME

DC LASER PROJECTORS

WILL OUTSELL XENON PROJECTORS

Let’s back up a bit

2012 2013 2014 2015 2016

First 55kL RGB laser demo

First dual 3P laser demo

First 6kL DCI laser-phosphor shipments

First RGB commercial installations

IMAX

DOLBY CINEMA

First 20kL L-Ph shipments

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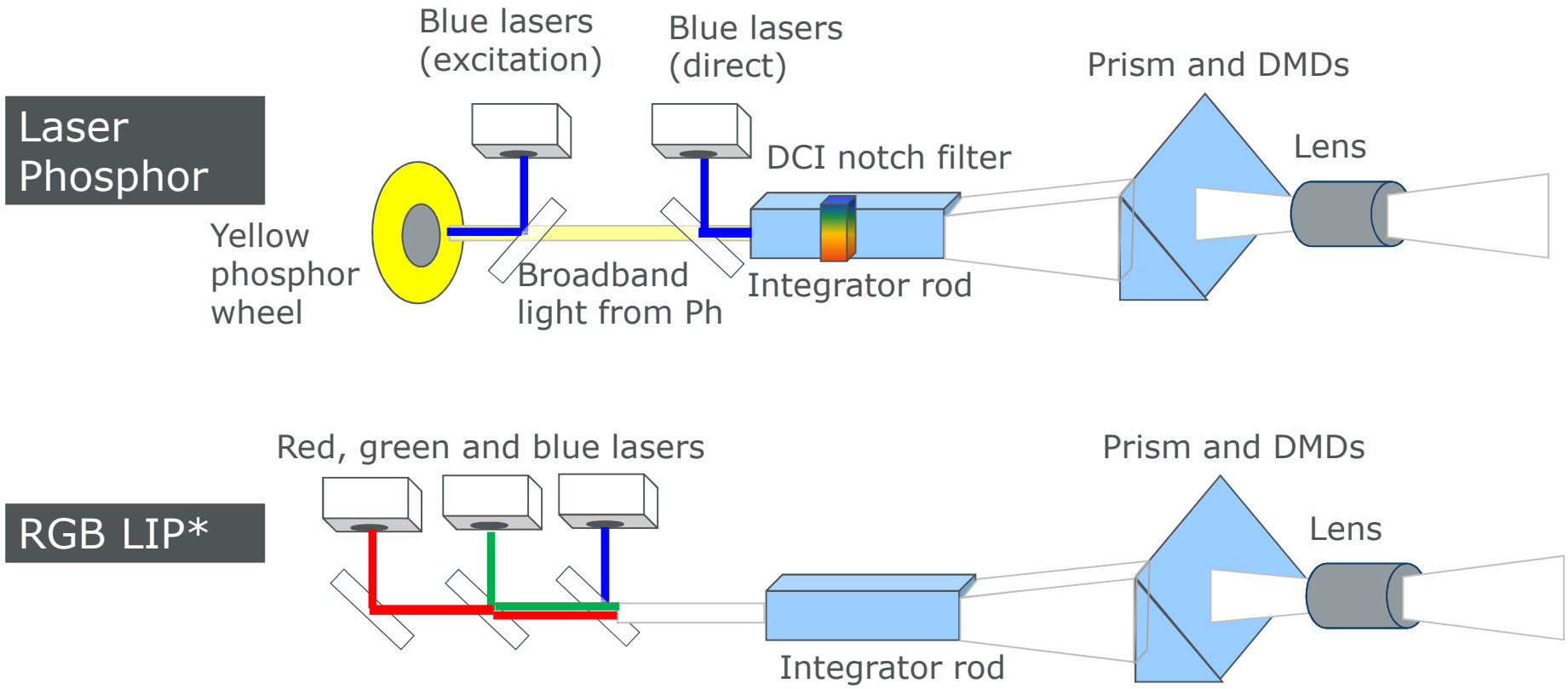
How does it work?



Laser-Phosphor

Strengths

- Lower cost
- Smaller form factor
- No speckle
- Retrofittable
- Mature supply chain

Weaknesses

- Limited brightness
- Lifetime
- WCG not possible

Best choice for mainstream screens

RGB laser

Strengths

- Ultra high brightness
- Wide Color Gamut
- 6P 3D possible
- Higher Contrast
- Long lifetime possible with adequate cooling

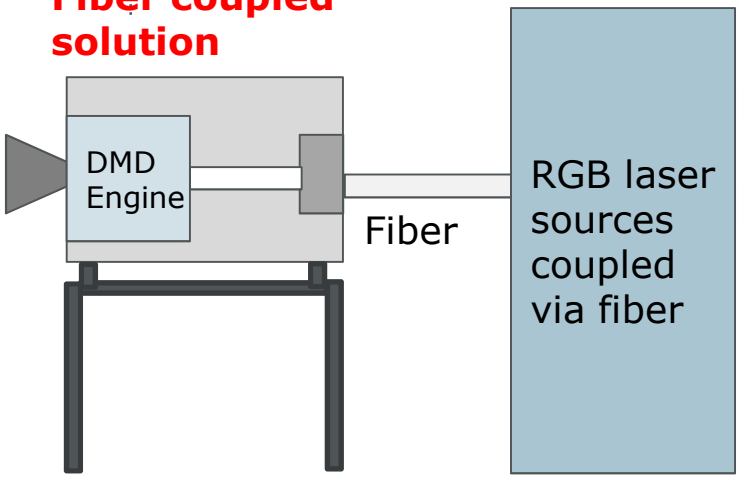
Weaknesses

- Form factor
- Speckle on high gain silver screens

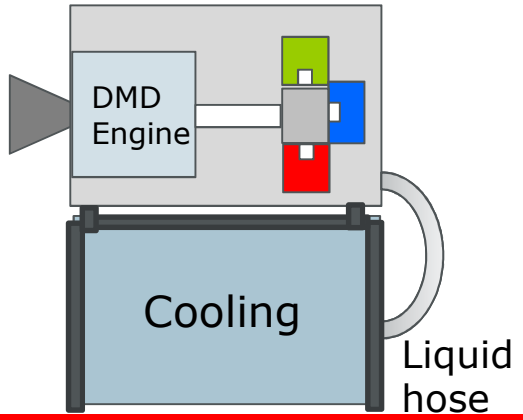
Best choice for PLF screens

Where’s the light?

Fiber coupled solution



Direct coupled solution



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Lasers in the box or out of the box?

Integrated RGB

Benefits	Challenges
• Most efficient solution • Lowest TCO • Enhanced laser safety • Plug and play install	• Only new builds • External chiller • Projector weight

Fiber coupled RGB

Benefits	Challenges
• Scalable light output • Remote source	• No power savings benefit over Xenon • Lower efficiency (higher laser and cooling cost/lumen) • Long installation time • Fragile fiber connectors

Laser safety - Reclassification

- With adoption of **EN 62471-5:2015**
- Cinema laser projectors can now be classified as Class 1, Risk Group 2/3
- Impact:
  - **2m** separation height instead of 3m (also for high bright laser projectors)
  - No requirement for a LSO at the company level
  - Still: Restricted access (booth), warning labels

IN TWO YEARS' TIME

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Why this claim?

Because lasers provide a cure where it hurts:

- *Premium image quality*
- *TCO savings and operational simplicity*

And – most of the products are almost there!

So what are we talking about?

No lamp-related costs

- Planning, purchasing, storing, replacing, warranty claims, disposal
- No cleaning/replacing the reflector
- No lamp alignment for max brightness

So what are we talking about?

Electrical consumption – Watt/kL

- Xenon projectors – around **240-280 W/kL** with a new lamp
  - Barco DP2K-20C: 18.500 lumens for 5.24kW
- RGB laser projectors **173W/kL**
  - Barco DP4K-60L: 56.000 lumens for 9.7kW
- Laser Phosphor can go as low as **140W/kL**
  - Barco DP2K-20CLP: 20.000 lumens for 2.86kW

So what are we talking about?

High Brightness

How can RGB laser projectors provide a high brightness? (range of 60.000lm)

1. ‘Collimated beams’ (lots of light on a small surface)

+

2. Subambient liquid cooling on the DMD (or it will burn)

- Contrast – very important parameter
  - Xenon contrast: 1500-2000:1
  - RGB projectors: between 2500:1 and 6000:1
  - Barco RGB **ANSI contrast**: 500-1000:1
    - 100-150:1 for Xenon or LCOS projectors
- The RGB ANSI contrast is a HUGE improvement over Xenon DLP and LCOS projectors

All the ingredients are there for laser to take over!

- TCO savings
- Image quality
- Maturing technology
- Regulation eased
- Current and future product portfolio

Thank you

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