

# Yellow Lasers for Biomedical Applications

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# Eye on the problem

VISION & EYE PROBLEMS ARE INCREASING AS AMERICA AGES

**90**  
MILLION

Americans over 40 have vision and eye problems

That's more than  
**3 in 5**



By 2050, without effective interventions:



Diabetic retinopathy ↑ 72%



Cataracts ↑ 87%



Glaucoma ↑ 100%



Age-related macular degeneration ↑ 100%



Vision impairment & blindness ↑ 150%



**COST OF VISION PROBLEMS**

↑ **157%** TO **\$373**  
BILLION



# Why Yellow Laser?

- Low intraocular scattering
- High absorption by hemoglobin and low absorption by xanthophyll.
- Use of train of pulses instead of CW mode reduces collateral retinal damage due to heat conduction.

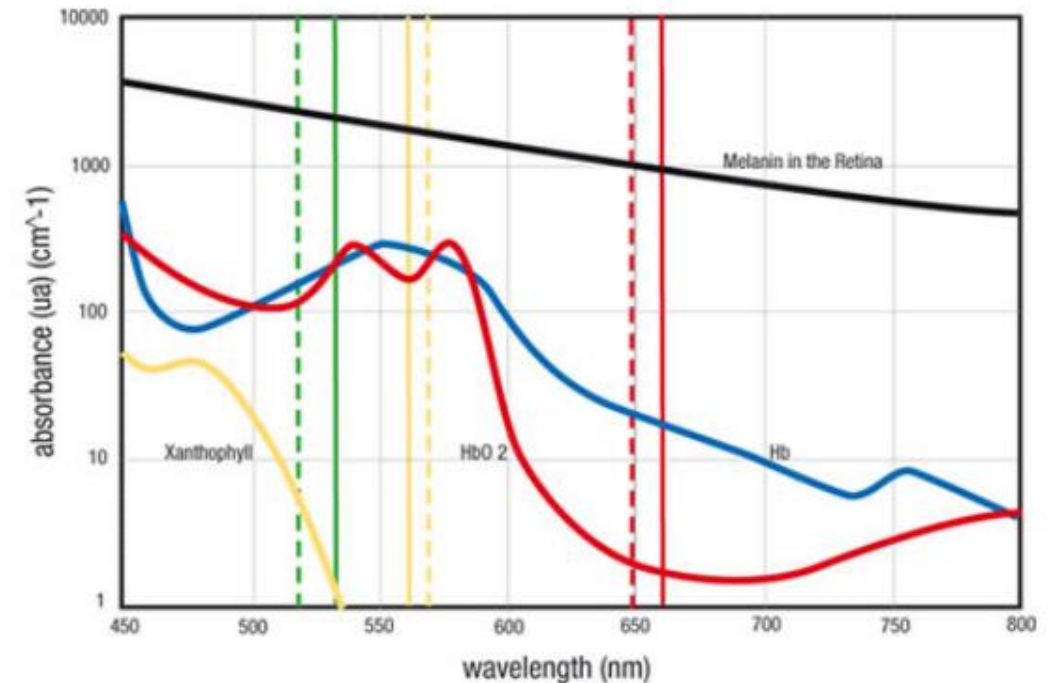
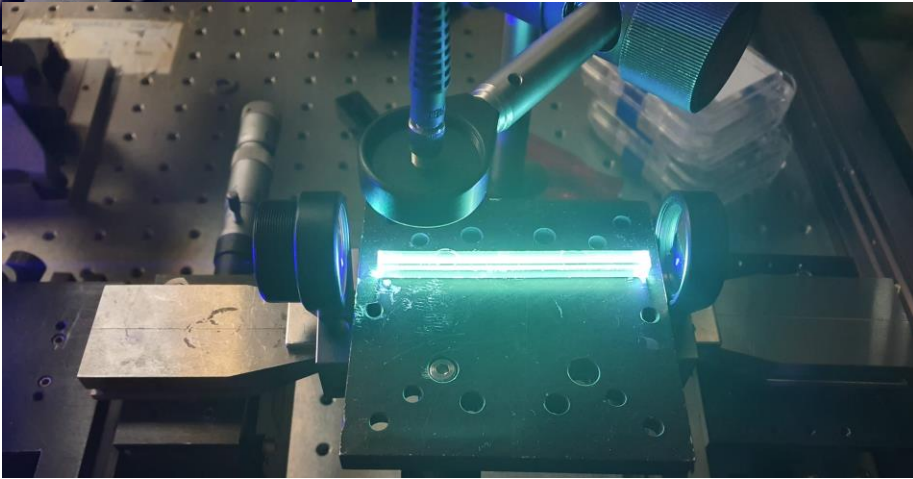
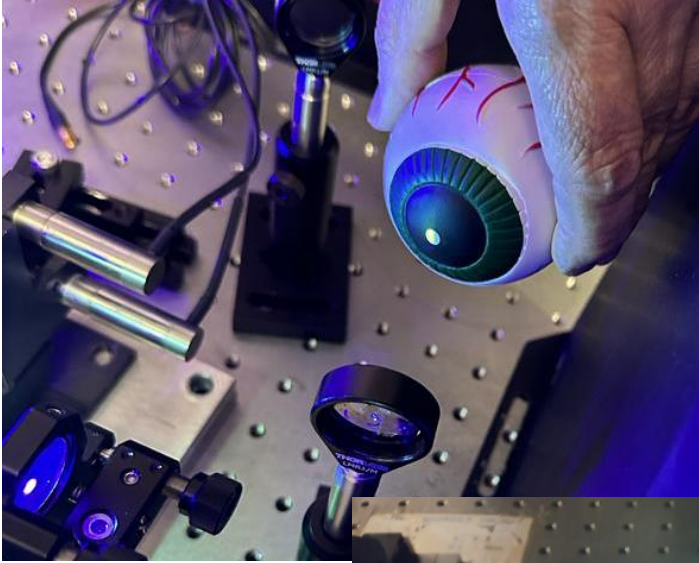


Fig 2: Ocular Chromophore Absorption Chart



# Dy:YLF Crystal



## Pros:

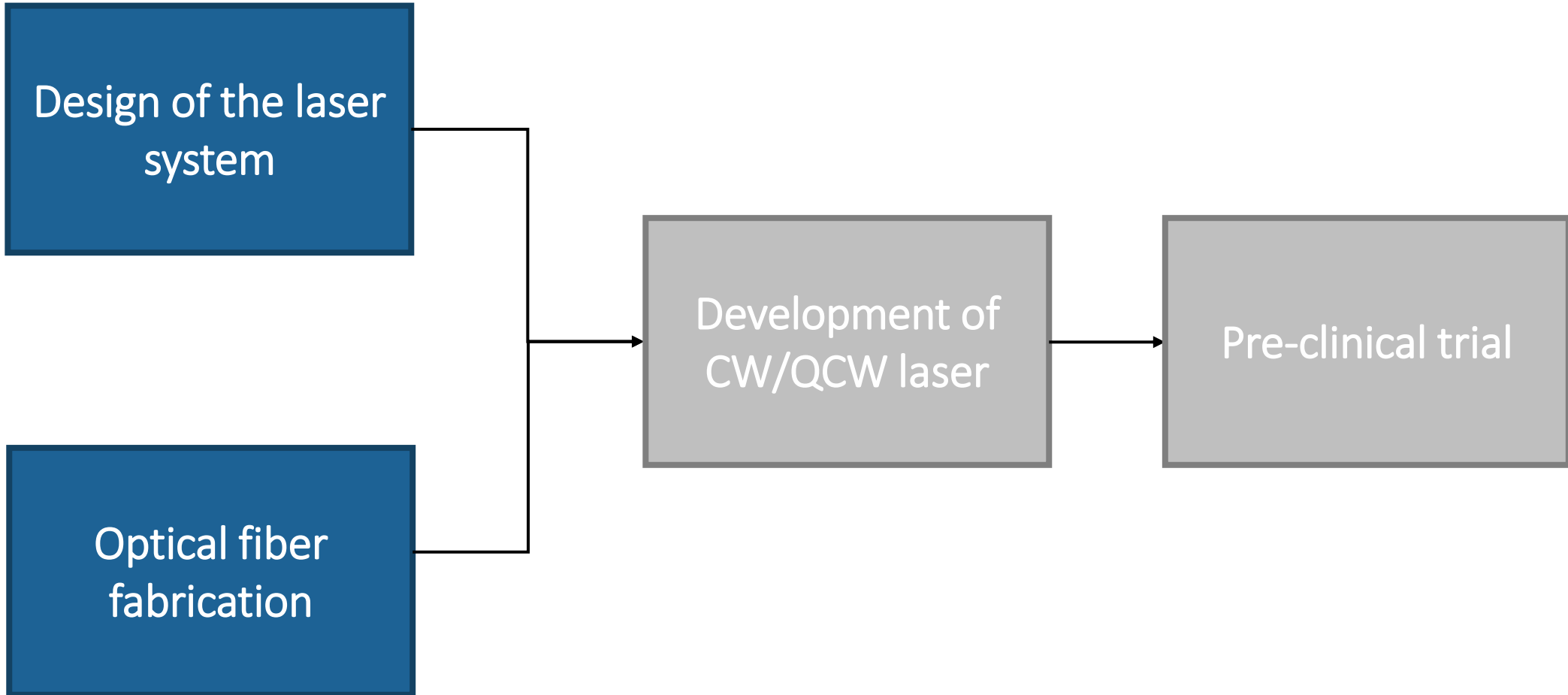
- Direct emission.
- Commercially available components.

## Cons:

- Difficult alignment.
- Sensitivity to environmental condition.

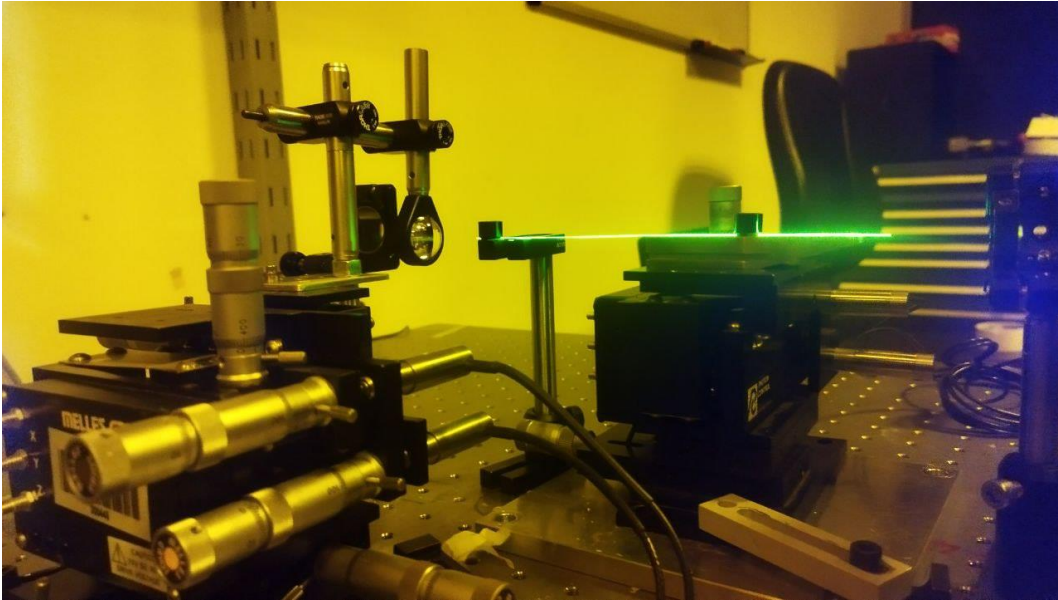


# Yellow FLICKer PRIN Project





# Dy-doped Optical Fiber



## Results:

- Assessed maximum injectable power of 30 W.
- Radiative lifetime and cross sections experimentally investigated.

## Work in progress:

- Direct inscription of FBGs on visible active fiber.

Thanks for your attention



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