



Lasers – only at the workplace?

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Austrian Research Centers



Historically



Science



ecare.com/lasersurgery.jpg

Medicine



Industry

Laserdiodes

- small
- cheap

recently: also powerful!

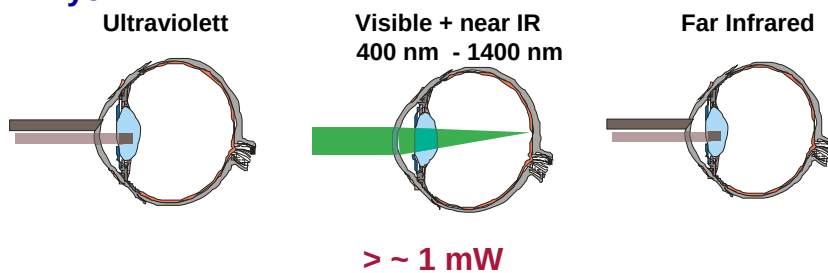


Diode pumped solid state laser (DPSS)
(green) up to 500 mW

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Hazards

▪ Eye

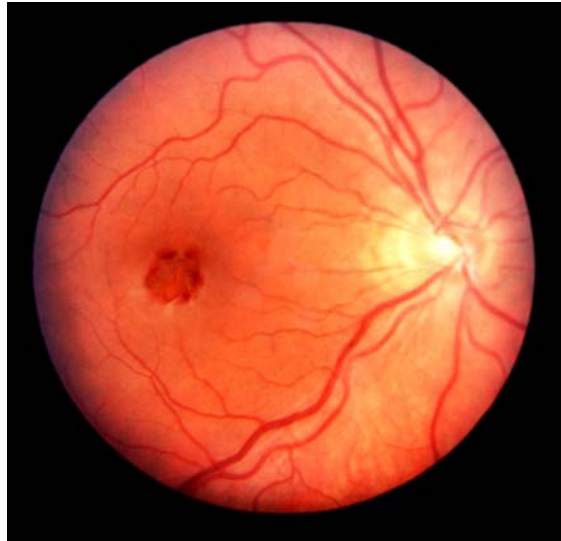


▪ Skin



> ~ 500 mW

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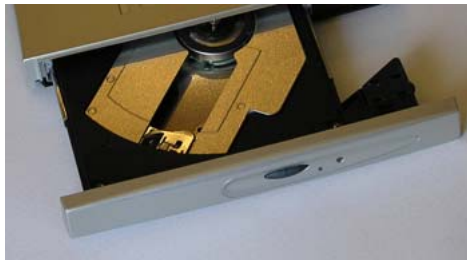



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„Home-use“ Lasers (Consumer Products)


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Mid-1980s: CD-Player

DVD Burner Blue-ray
up to 450 mW (Sanyo)
(the faster, the more power)

Laserprinter

ALL ENCLOSED
Radiation not accessible
(Class 1)



www.epson.com

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Medical, Cosmetic

- Low Level Lasertherapy
(Biostimulation)



- Hair Removal



Laser „Needle“ (Diabetes)



Usually eye-safe

**Usually treatment
also safe**

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Laser Television

- **Rear Projection**
- TV on Market
- (1.6 m diagonal – \$ 7000)
- **Front projection**
- difficult to make safe
- (radiation accessible)



<http://www.mitsubishi-tv.com/product/L65A90>

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Measurement

- Distance
- Speed (Police)



www.leica.com



foto: Riegler

Class 1

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Lasershow

for „consumer“ prize:

traditionally up to 5 mW
recently: up to **400 mW**



www.laserworld.com

PROBLEM! Open beam, collimated, exposure likely
Scan makes it saf(er) – but does not always work

Laserpointer



1990s: up to 5 mW, red
recently: up to **400 mW (green)!**

PROBLEM! Open, collimated, looks same as 1 mW!



THE BEST QUALITY LASER POINTERS ONLINE – GUARANTEED

HOME | GREEN LASERS | BLUE LASERS | OEM LASERS | VIDEOS | TESTS

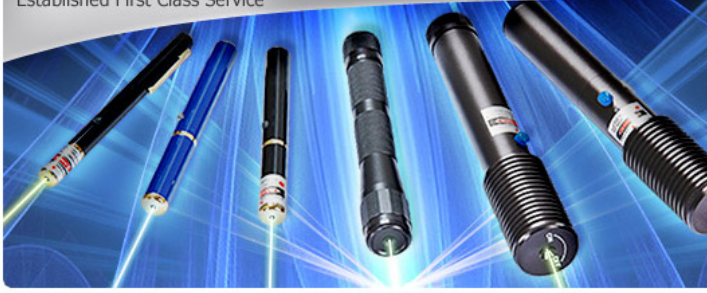
Categories

- Handheld Lasers
- Blue Lasers
- Green Lasers
- Red Lasers
- Infrared Lasers
- UV Lasers
- Violet Lasers
- Yellow Lasers
- Laser Diode Array
- Laser Optics
- Accessories
- Diffraction Gratings
- Laser Safety Glasses

Help

- Privacy statement
- Terms & Conditions
- Payment Introduction

WORLD'S MOST POWERFUL LASERS & COOLEST GADGETS
Established First Class Service



Featured products



Viper Series 95mW
Viper Series Green Laser Pointer, Average Output power >95mW
Price: US\$199.99 (Euro 135.99)

Quantity:



www.kk.org/cooltools/archives/green_laser.png


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17cr.blogspot.com

17cr.blogspot.com

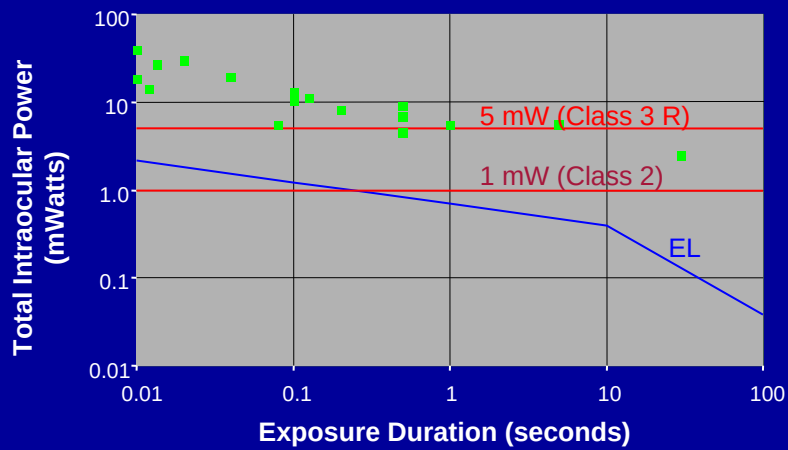
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www.chelseapiers.tv

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Argon Laser Radiation (514.5 nm)



Bruce Stuck

Serious: Aircraft „Attack“



Dazzle!
Flash Blindness!

www.news.com.au

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> ~ 500 mW

- Fire hazard
- Skin hazard



Laserpointer



- **ICNIRP Statement on Laser Pointers:**
- Health Physics, Volume 77, Page 218 (1999)
- **WHO Factsheet 202 (1998)** 
- **< 1 mW (Class 2) recommended**
- Use by children discouraged
- Risk for professional use up to 5 mW not great
- (Class 3R)

Challenge

- Governmental market surveillance
(product safety)
- Technical Standardisation (IEC)

National regulations

- Usually regulate what is allowed to be **sold/imported**
- Europe: „Product has to be safe“
considering
 - known hazards
 - warning
 - and personal protection(does not mean zero risk)

Specific Laserpointer Regulations

- Australia 1 July 2008: „banned“; permit needed to import laser pointers > 1 mW
- Western Australia: High power laser pointer fall under weapons law.
Possession: up to 14 year in prison
- USA: FDA (CDRH): if marketed as laser pointers, limited to 5 mW
- Europe: usually Class 2 (< 1 mW), specific only in Austria
- **Enforcement challenging**

Other Higher Power Laser Products

- „System“ established for occupational laser applications
- (based on general Occupational Health laws)
- For **Class 3B** (eye hazard) and **Class 4** (eye and skin hazard):

User precautions:

- Laser Safety Officer (2 day training)
- Training of user
- Defined laser hazard zone
- Eye protection



General - Consumer Product - Laser Law?

- **General restriction to Class 2 (< 1 mW) is overrestrictive!**
- Some higher power laser products safe for eye

Possibility:

- **„exposure for eye < Exposure limit“**
- but guidance needed for
- assumed exposure duration
- (misuse?)



Helpful: IEC safety standards

- IEC safety standards (for instance applicable for laser shows) should be reviewed to address consumer product concerns
- (safety can not be based on user precautions for consumer products)