

Typical DVD burners, which can operate in both CW and pulsed mode, have powers on the order of **250 mW**.



DVD burner



Paranal laser guide star

The setup built by Toptica Photonics for the ESO's Very Large Telescope combines four **22-W** CW lasers to create artificial "guide stars" for adaptive optics.

Laser power spans many orders of magnitude

—from the microwatt beams of some continuous-wave (CW) lasers, to the European Extreme Light Infrastructure (ELI), whose femtosecond-scale pulses can deliver petawatt peak power (p. 26). Here are a few examples of laser power by the numbers.

One system recently built for ELI, with an average power of 53 W, delivers >50-mJ pulses of <10-fs width, for peak powers of **5-TW**—at high (kHz) repetition rates.



ELI-ALPS

The laser built for ELI-Beamlines, with an average power of 300 W, will deliver pulses with 30 J of energy and 30-fs pulse widths, for peak powers **>1 PW**, at repetition rates >1Hz.



HAPLS



Milliwatt
 10^{-3}

Laser pointer, barcode scanner



These familiar, CW laser devices generally have power levels of **1–5 mW**.

10^{-2}

10^{-1}

Watt
 10^0

CO₂ surgical lasers can operate at CW powers of **30–100 W**.



10^1

10^2

Medical and surgical lasers

Kilowatt
 10^3

10^4

Industrial fiber lasers



IPG Photonics has recently marketed a fiber laser with **100 kW** CW output power for cutting, welding and drilling applications.

Megawatt
 10^6

Next-gen directed-energy weapons

10^7

The U.S. Navy reportedly plans to test a **150-kW** CW laser weapon aboard a test ship by 2018.



10^8

Gigawatt
 10^9

Breakthrough Starshot

10^{10}

10^{11}

Highly speculative proposal envisions using a 10-km² phased laser array to create a CW beam of **100 GW** average power to accelerate tiny spacecraft.

See OPN, May 2017, p. 26

Terawatt
 10^{12}

10^{13}

10^{14}

National Ignition Facility



Petawatt
 10^{15}

To drive laser-fusion experiments, NIF's 192 beamline amplifiers combine to create 1.85 MJ of ultraviolet laser energy and a peak flash of **500 TW**.

Laser Power