

Nd-YAG laser 2.6.09-00



What you can learn about ...

- Optical pumping
- Spontaneous emission
- Induced emission
- Inversion
- Relaxation
- Optical resonator
- Resonator modes
- Polarization
- Frequency doubling

Principle:

The rate equation model for an optically pumped four-level laser system is determined. As lasing medium, a Nd-YAG (Neodymium-Yttrium Aluminium Garnet) rod has been selected which is pumped by means of a semiconductor diode laser.

The IR-power output of the Nd-YAG laser is measured as a function of the optical power input and the slope efficiency as well as the threshold power are determined.

What you need:

Basic set optical pumping	08590.93	1
Sensor for measurement of beam power	08595.00	1
Nd-YAG laser cavity mirror/holder	08591.01	1
Laser cavity mirror frequency doubling	08591.02	1
Frequency doubling crystal in holder	08593.00	1
Filter plate, short pass type	08594.00	1
Digital multimeter 2010	07128.00	1
Oscilloscope 30 MHz, 2 channels	11459.95	1
Screened cable, BNC, $l = 750$ mm	07542.11	3
Protection glasses for Nd-YAG laser	08581.20	1
Cleaning set for laser	08582.00	1

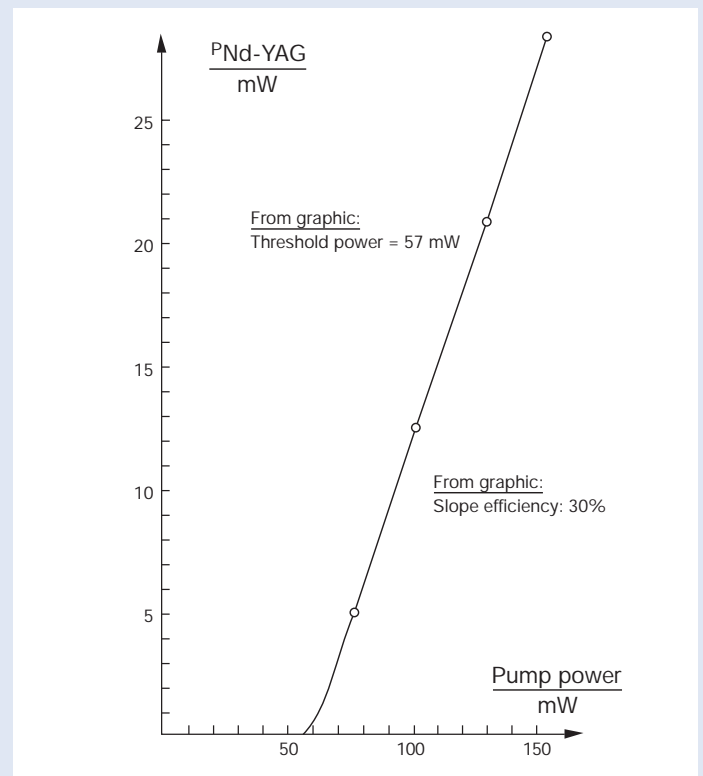
Optional:

Optical base plate in exp. case	08700.01	1
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**Complete Equipment Set, Manual on CD-ROM included
Nd-YAG laser P2260900**

Tasks:

1. Set up the Nd-YAG laser and optimize its power output.
2. The IR-power output of the Nd-YAG laser is to be measured as a function of the pump power. The slope efficiency and the threshold power are to be determined.
3. Verify the quadratic relationship between the power of the fundamental wave, with $\lambda = 1064$ nm, and the beam power of the second harmonic with $\lambda = 532$ nm.



Nd-YAG laser power output as a function of the pump power $\lambda = 808.4$ nm.

Finally, a KTP-crystal is inserted into the laser cavity and frequency doubling is demonstrated. The quadratic relationship between the power of the fundamental wave and the beam power for the second harmonic is then evident.