2.6.08-00 Optical pumping

What you can learn about ...

- ➔ Spontaneous emission
- ➔ Induced emission
- ➔ Mean lifetime of a metastable state
- ➔ Relaxation
- ➔ Inversion
- ➔ Diode laser

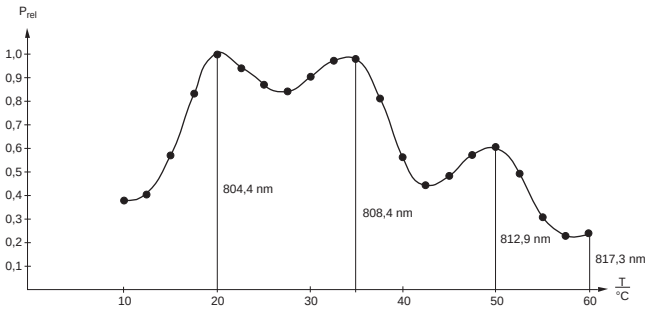
Principle:

The visible light of a semiconductor diode laser is used to excite the neodymium atoms within a Nd-YAG (Neodymium-Yttrium Aluminium Garnet) rod. The power output of the semiconductor diode laser is first recorded as a function of the injection current. The fluorescent spectrum of the Nd-YAG rod is then determined and the maon absorption lines of the Nd-atoms are verified. Conclusively, the mean life-time of the $^4F_{3/2}$-level of the Nd-atoms is measured in appoximation.

What you need:

Basic set optical pumping	08590.93	1
Sensor for measurement of beam power	08595.00	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
Optional:		
Optical base plate in exp. case	08700.01	1

Complete Equipment Set, Manual on CD-ROM included
Optical pumping P2260800



Relative fluorescent power of the Nd-YAG rod as a function of the diode temperature (wavelength) for I = 450 mA.

Tasks:

1. To determine the power output of the semiconductor diode laser as a function of the injection current.
2. To trace the fluorescent spectrum of the Nd-YAG rod pumped by the diode laser and to verify the main absorption lines of neodymium.
3. To measure the mean life-time of the $^4F_{3/2}$-level of the Nd-atoms.
4. For further applications see experiment 2.6.09 “Nd-YAG laser”.