

Helium Neon Laser 2.6.07-01



What you can learn about ...

- Spontaneous and stimulated light emission
- Inversion
- Collision of second type
- Gas discharge tube
- Resonator cavity
- Transverse and longitudinal resonator modes
- Birefringence
- Brewster angle
- Littrow prism
- Fabry Perot Etalon

Principle:

The difference between spontaneous and stimulated emission of light is demonstrated. The beam propagation within the resonator cavity of a He-Ne laser and its divergence are determined, its stability criterion is checked and the relative output power of the laser is measured as a function of the tube's position inside the resonator and of the tube current.

What you need:

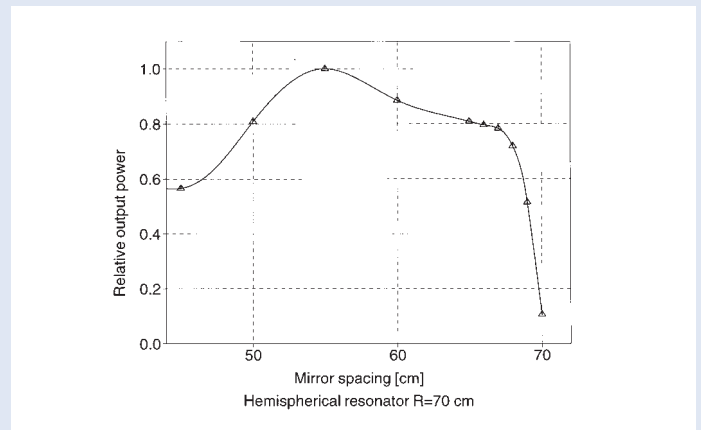
HeNe laser, basic set	08656.93	1
Photoelement, silicon	08734.00	1
Digital multimeter 2010	07128.00	1
Screen, white, 150 x 150 mm	09826.00	1
Danger sign "Laser"	06542.00	1
Barrel base -PASS-	02006.55	1
Vernier calipers, stainless steel	03010.00	1
Measuring tape, $l = 2$ m	09936.00	1
Protection glasses HeNe laser	08581.10	1
Cleaning set for laser	08582.00	1

Complete Equipment Set, Manual on CD-ROM included Helium Neon Laser P2260701

Option:

Experimentation set Helium-Neon laser, advanced set	08656.02	1
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Helium Neon Laser, advanced set P2260705



Relative output power as a function of mirror spacing.

The following items can be realized with advanced set **08656.02**.

By means of a birefringent tuner and a Littrow prism different wavelengths can be selected and quantitatively determined if a monochromator is available.

Finally you can demonstrate the existence of longitudinal modes and the gain profile of the He-Ne laser provided an analysing Fabry Perot system is at your disposal.

Tasks:

1. Set up the He-Ne laser. Adjust the resonator mirrors by use of the pilot laser. (left mirror: VIS, HR, plane ; right mirror: VIS, HR, R = 700 mm)
2. Check on the stability condition of a hemispherical resonator.

3. Measure the integral relative output power as a function of the laser tube's position within the hemispherical resonator.

4. Measure the beam diameter within the hemispherical resonator right and left of the laser tube.

5. Determine the divergence of the laser beam.

6. Measure the integral relative output power as a function of the tube current.

The He-Ne laser can be tuned using a BFT or a LTP. Longitudinal modes can be observed by use of a Fabry Perot Etalon of low finesse. Remark: These points can only be covered quantitatively if a monochromator and an analysing Fabry Perot system are available.

You can find more advanced optics in this brochure

Order No. 00117.02
(see page 121)

