

campus[®]

CA-1140

Fabry Perot Resonator



Within this kit the properties of optical resonators shall be shown to the students. For this purpose the Fabry Perot Resonator has been chosen because it is the most important and used of all laser resonators. Properties and behavior will be presented as well as the characteristics like resonance, free spectral range and finesse of the resonator. On the other hand the criteria of the different resonator types will be discussed and shown in measurements to the students. The final application of the Fabry Perot interferometer is the use as a spectrum analyzer for light, the scanning Fabry Perot. With the help of the included HeNe Laser as the light source, the mode

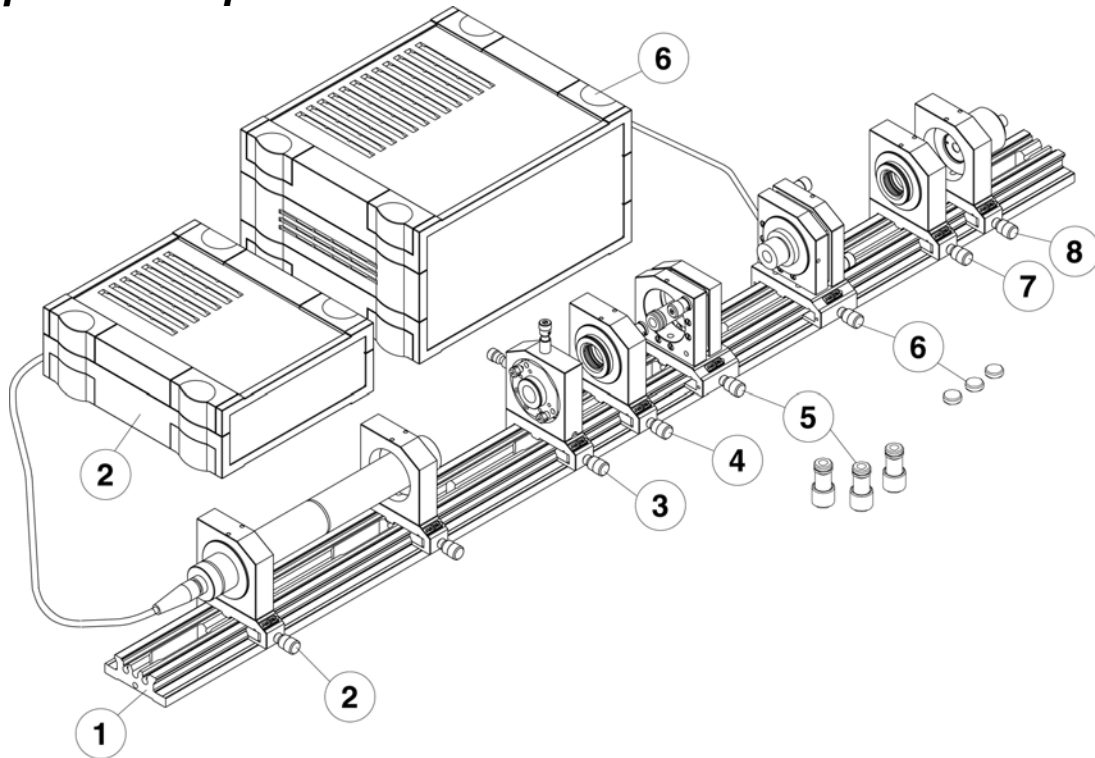
spectra of it will be shown, measured and discussed by the students.

The set-up includes all needed resonator mirrors exchangeable in adjustment holders. One is mounted on a piezo translator and controlled by a high voltage source to realize the scanning function. The laser beam is prepared with the needed optics to meet the demands of a Fabry Perot in the lab for demonstration purposes. The evaluation of the measured signals will be done by a PIN-photo diode with an amplifier belonging to it. The time resolved signals of the Fabry Perot will be shown synchronized to the piezo displacement on a oscilloscope (optional available).

Educational Objectives:

- Two Beam Interference
- Multiple Beam Interference
- Free Spectral Range & Finesse
- Types of Fabry Perot
- Stability Criterion
- Spectral Analysis of a HeNe Laser

Set-Up and Components



- 1 Flat rail 1000 mm with scale
- 2 HeNe test laser in holder on carriers with power supply
- 3 Beam expander in 5 axes adjustment holder on carrier
- 4 Beam expander in holder $f=20/150$ mm
- 5 Laser mirror adjustment holder on carrier and set of mirrors (R75, R100, plane)
- 6 Laser mirror adjustment holder with piezo actuator on carrier with linear drive and set of mirrors (R75, R100, plane)
- 7 Control Electronics PTC 1000
- 8 Beam shaping optics for laser beam in holder on carrier
- 9 Photo detector in holder on carrier
- 10 3 BNC cables
- 11 Set for optics cleaning
- 12 User manual

Measurements and Handling

- Resonance properties
- Fabry Perot resonator types
- Free spectral range
- Finesse
- Mode spacing