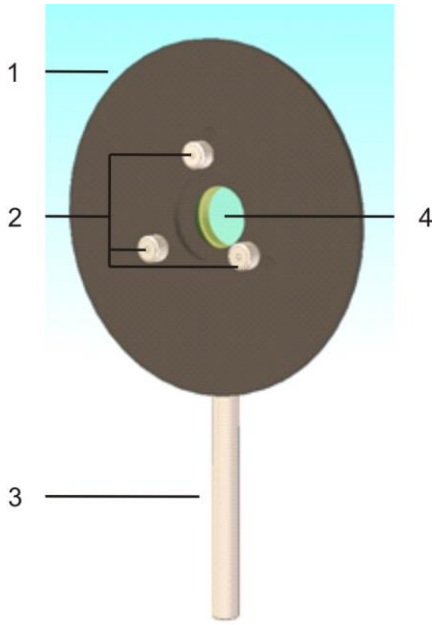
Fabry-Pérot Etalon 1020903

Instruction manual

11/17 TL/UD



1 Metal frame
2 Adjustment screws
3 Rod
4 Fixed etalon

1. Description

The Fabry-Pérot etalon is a fixed etalon inside a black metal frame on a rod. It is used for optical filtering and generating interference rings for the experiment to demonstrate the normal Zeeman effect. This fixed etalon consists of a substrate with highly reflective, if only partially reflecting, mirror coatings on both sides. The substrate and mirrors form an optical resonator (Fig. 1) which fulfils the resonance conditions for a specific wavelength $\lambda = 643.8$ nm, which is that of the red cadmium line. The inclination of the etalon to the optical axis can be adjusted by means of three adjustment screws in the frame, allowing the pattern of the interference rings to be shifted both horizontally and vertically.

The condition for interference is as follows:

$$k \cdot \lambda = 2 \cdot d \cdot \sqrt{n^2 - \sin^2 \alpha} = 2 \cdot d \cdot n \cdot \cos\beta$$

k: Integer number
λ: Wavelength of light
d: Thickness
n: Refractive index
α: Angle of incidence
β: Angle of refraction

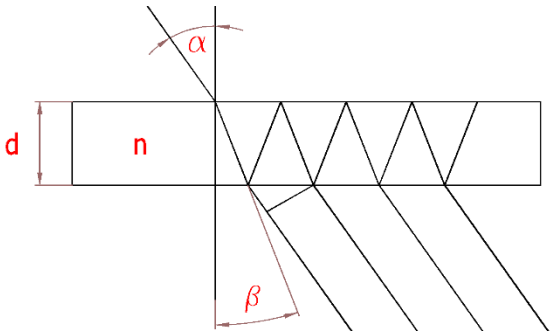


Fig. 1: Ray diagram for rays through the fixed etalon. Light waves exiting after multiple reflection at the boundary surfaces interfere with one another. The resulting interference ring pattern could, for example be captured on a screen or by a digital camera.

2. Technical data

Wavelength:	644 nm
Substrate material:	Suprasil
Refractive index:	1.4567
Flatness:	32 nm (λ/20)
Coefficient of reflection:	0.85
Substrate thickness:	4 mm
Substrate diameter:	25 mm
Aperture:	22 mm
Diameter of frame:	130 mm
Diameter of rod:	10 mm
Top of rod – optical axis:	150 mm

3. Additionally required equipment

1 Optical rider D 90/36	1012401

4. Storage, cleaning and disposal

- Keep the equipment in a clean, dry and dust-free place.
- Do not use any aggressive cleaning agents or solvents to clean the equipment.
- It is not usually necessary to clean the fixed etalon. If necessary, you can use an objective brush, puff bellows or a soft, fluff-free cloth especially suited for optics. Do not touch the fixed etalon with your fingers.
- To clean the mechanical parts use a slightly dampened soft cloth.
- The packaging should be disposed of at local recycling points.
- Should you need to dispose of the equipment itself, never throw it away in normal domestic waste. If being used in private households it can be disposed of at the local public waste disposal authority.