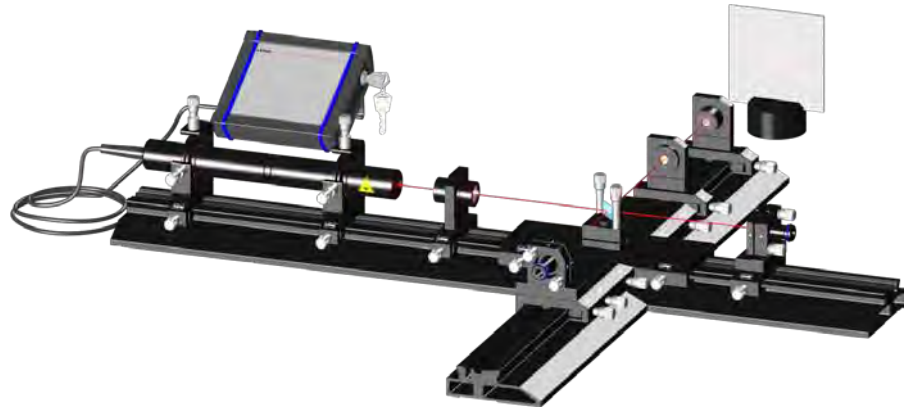


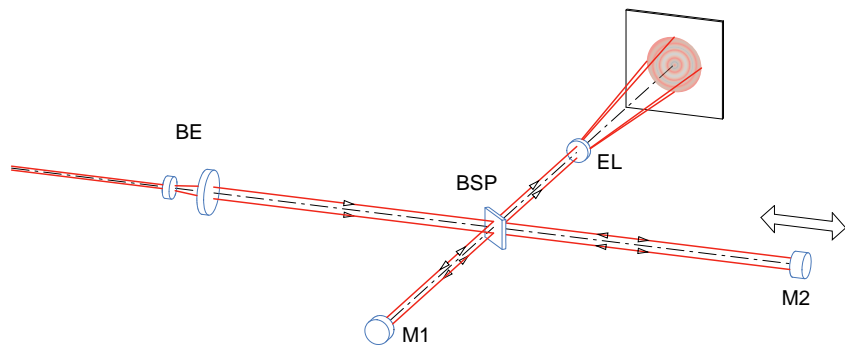
P5881 Michelson's laser interferometer I

- ✓ Coherence of laser radiation
- ✓ Two beam interference
- ✓ Index of refraction
- ✓ Speed of light
- ✓ Wave fronts
- ✓ Fringe contrast
- ✓ Coherence length
- ✓ Two mode HeNe laser
- ✓ Longitudinal mode spacing

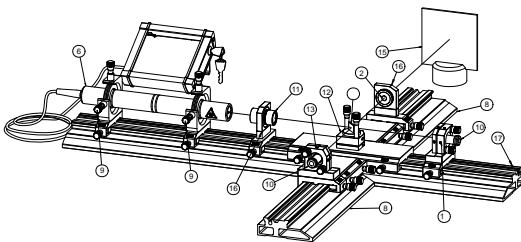


Principle of operation

The beam of the probe laser is expanded (BE) and divided into two beams at the beam splitter plate (BSP). One beam is directed to the mirror M1 and the other to M2. The returning beams are superimposed by the beam splitter plate and expanded by means of the concave lens (EL). The resulting interference pattern is imaged on a white screen. Depending on the beam divergence circular or linear fringes are generated and observed.

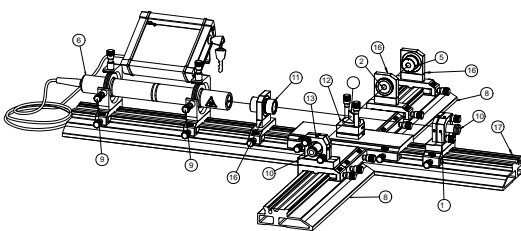


Examples of investigation and measurement



Set-up a Michelson's interferometer

The beam of the HeNe probe laser (6) is expanded (11) and divided by the beam splitter plate (4) which is mounted into the adjustment holder (12). From here the beams are directed to the mirror (10) which are precisely adjustable (13) in such a way that the returning beams are exactly superimposed. A concave lens (2) expands the interference pattern of the superimposed beams on the white screen (15). By changing the divergence of the laser beam by adjusting the beam expander (11) the radius of curvature of the wave front is modified resulting in special interference pattern. For plane wave fronts linear and for curved ones circular interference pattern occur.



Measuring the coherence length of the probe laser

The coherence length of a light source is determined by the bandwidth of its emission. To determine this important parameter one of the mirror holder (14) is provided with a gear and pinion drive allowing the mirror holder to be translated along the rail. By measuring the contrast at various position by means of the photo detector (5) and an oscilloscope the coherence length can be derived from the measured contrast function. Since the provided HeNe laser emits two orthogonal modes, the coherence length can be calculated ab initio and compared to the measured one.

P5881 Michelson laser interferometer consisting of:

Item	Qty	Description
1	1	BNC connection leads, set of 1
2	1	Biconcave lens f=-10 mm, C25 mount
3	1	Optic cleaning set
4	1	Beam splitter plate 50/50 @ 632 nm, on holder
5	1	Photodetector Si PIN
6	1	HeNe Pilot laser Ø 30 mm
7	1	Target screen, click 25
8	2	Profile Rail MG-65, 300 mm
9	2	Laser adjustment holder, soft ring 30 mm, C20
10	2	Laser mirror 1/2", flat, HR @ 632 nm, click 30 mm
11	1	Beam expander 8x, click 25 mm
12	1	Carrier cross-piece with adjustable prism stage
13	1	Laser mirror adjustment holder C30 mount, carrier

Item	Qty	Description
14	1	Laser mirror adjustment C30, carrier, pinion drive
15	1	Screen with carrier 20 mm
16	3	Mounting Plate, including carrier 20 mm, C 25
17	1	Profile Rail, 500 mm with gear rack 200 mm

Required

Option:

- 1 Oscilloscope 100 MHz digital, two channel

Options:

- 1 Motorised translation unit with triple reflector, travel 50 mm
- 1 Technical laser interferometer extension
- 1 Set of spare parts