

Coherence and width of spectral lines with Michelson interferometer 2.2.06-00



What you can learn about ...

- Fraunhofer and Fresnel diffraction
- Interference
- Spatial and time coherence
- Coherence conditions
- Coherence length for non punctual light sources
- Coherence time
- Spectral lines (shape and half width value)
- Broadening of lines due to Doppler effect and pressure broadening
- Michelson interferometer
- Magnification

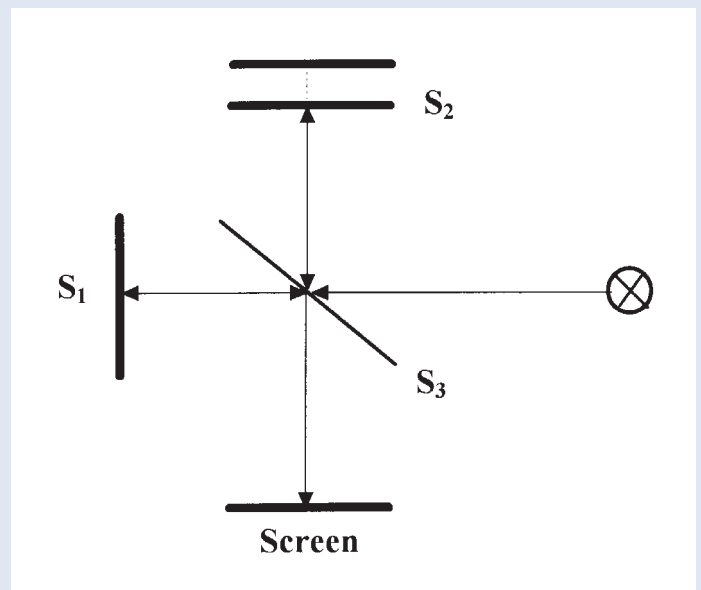
Principle:

The wavelengths and the corresponding lengths of coherence of the green spectral lines of an extreme high pressure Hg vapour lamp are determined by means of a Michelson interferometer.

What you need:

Michelson Interferometer	08557.00	1
High pressure mercury vapour lamp CS 50 W	08144.00	1
Power supply for Hg-CS/50 W Lamp	13661.97	1
Optical profile bench, $l = 100$ cm	08282.00	1
Base for optical profile bench	08284.00	2
Slide mount, $h = 30$ mm	08286.01	5
Lens holder	08012.00	3
Object holder 50 x 50 mm	08041.00	1
Swingin arm	08256.00	1
Barrel base -PASS-	02006.55	2
Stand tube	02060.00	2
Mounted lens $f = 20$ mm	08018.01	1
Mounted lens $f = 200$ mm	08024.01	1
Iris diaphragm	08045.00	1
Coloured filter, green, 525 nm	08414.00	1
Ground-glass screen 50 x 50 mm	08136.01	1
Diaphragm holder, attachable	11604.09	1
Measuring magnifier	09831.00	1
Slit, adjustable up to 1 mm	11604.07	1
Diaphragm with 4 double slits	08523.00	1

Complete Equipment Set, Manual on CD-ROM included
Coherence and width of spectral lines
with Michelson interferometer P2220600



Beam path in Michelson's interferometer.

Different double slit combinations are illuminated to verify the coherence conditions of non punctual light sources. An illuminated auxiliary adjustable slit acts as a non punctual light source.

Tasks:

1. Determination of the wavelength of the green Hg spectral line as well as of its coherence length.
2. The values determined in 1. are used to calculate the coherence time and the half width value of the spectral line.
3. Verification of the coherence condition for non punctual light sources.