2.3.06-00 Diffraction intensity through a slit and a wire – Babinet's theorem

What you can learn about ...

- ➔ Huygens' principle
- ➔ Interference
- ➔ Fraunhofer und Fresnel diffraction
- ➔ Babinet's theorem
- ➔ Poissons' spot
- ➔ Coherence
- ➔ Laser

Principle:

An aperture consisting of a single slit and a complementary strip (wire) is illuminated with a laser beam. The corresponding diffraction patterns are measured according to position and intensity with a photocell which can be shifted.

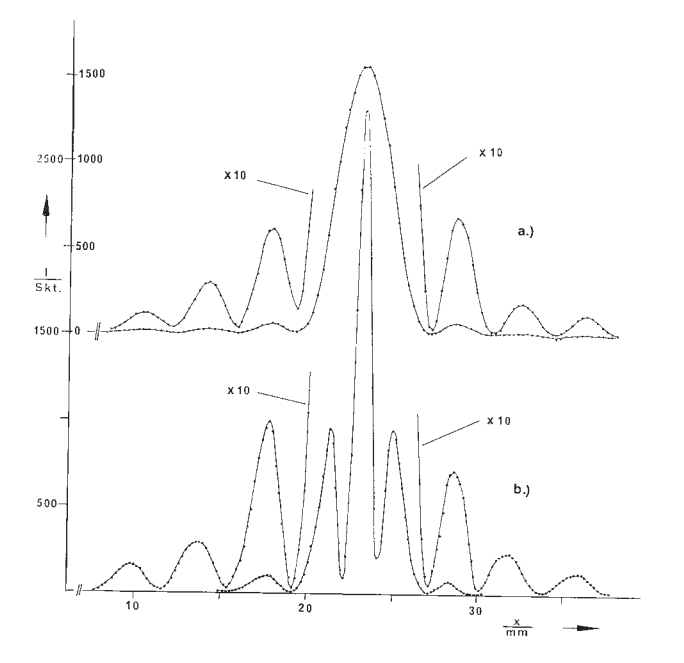
What you need:

Laser, He-Ne 1.0 mW, 220 V AC	08181.93	1
Universal measuring amplifier	13626.93	1
Optical profile bench l = 150 cm	08281.00	1
Base f. opt. profile-bench, adjust.	08284.00	2
Slide mount f. opt. pr.-bench, h = 30 mm	08286.01	3
Slide device, horizontal	08713.00	1
Object holder, 5 x 5 cm	08041.00	1
Photoelement f. opt. base plt.	08734.00	1
Screen, with diffracting elements	08577.02	1
Digital multimeter 2010	07128.00	1
Connecting cable, l = 750 mm, red	07362.01	1
Connecting cable, l = 750 mm, blue	07362.04	1

Complete Equipment Set, Manual on CD-ROM included

Diffraction intensity through a slit and a wire – Babinet's theorem P2230600

You can find more advanced optics in this brochure Order No. 00117.02 (see page 121)



Diffraction intensity I as a function of the position x for single slit a) and strip b). Width of the diffracting object b = 0.2 mm.
The intensities in the areas next to the central peak are represented extended by a factor of 10. (Distance between diffracting object and photocell L = 120 cm; Wavelength of the laser light λ = 632.8 nm)

Tasks:

1. Determination of the intensity distribution of the diffraction patterns due to a slit and complementary strip (wire).
2. Determination of the intensity relations of the diffraction pattern peaks for the single slit.
3. Babinet's theorem is discussed using the diffraction patterns of the slit and the complimentary strip.