Object of the experiment

1. Demonstrating the spectra of helium, neon, and hydrogen

Setup

Darken the room completely.

Apparatus

1 Spectral tube, He	467 67
1 Spectral tube, Ne	467 69
1 Spectral tube, H_2	467 66
1 Holder for spectral tubes	467 81
1 Measuring resistor, 100 kΩ	536 251
1 High-voltage power supply, 10 kV	521 70
1 Safety connecting lead, 25 cm, red	500 611
1 Safety connecting lead, 100 cm, rot	500 641
1 Safety connecting lead, 100 cm, blue	500 642
1 Safety connecting lead, 25 cm, yellow/green	500 610
1 Stand base, V-shape, small	300 02
1 Stand rod, 10 cm, 12 mm diam.	300 40
1 Leybold multiclamp	301 01
5 Prism, flint glass	465 32
Alternative:	
5 Ruled grating, 6000/cm (Rowland)	471 23

Carrying out the experiment

- Insert the spectral tube Ne in the holder for spectral tubes.
- Switch the high-voltage power supply on, and slowly increase the voltage until the spectral tube ignites (2-6 kV).
- Looking through a prism or a Rowland grating, observe the spectral tube from a distance of 1 m to 5 m.
- Repeat the experiment with the spectral tubes He and H_2.

Remark on using a prism:

Look in the direction of the spectral tube.

Hold one edge of the prism near the corner of the right eye, and turn your head along with the prism to the right until you see a spectrum.

Observation

The spectra of neon, helium, and hydrogen consist of spectral lines of different colours. The spectral lines are separated by dark spaces in between them.

The spectral lines of different gases are different from each other.

Evaluation

By means of gas discharge tubes only spectra that consist of individual lines are obtained. These spectra are called line spectra.

The wavelengths of the individual spectral lines are characteristic of the respective gas.

Remark:

Line spectra of various gases and the wavelengths of the spectral lines are compiled in the spectrum chart (667 710).

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