

Optical instruments

Cameras

Zoom lens

Object of the experiment

1. Demonstrating the principle of operation of a zoom lens

Setup

Darken the room completely.

Apparatus

1 Optical bench, S1 profile, 1 m.....	460 310
4 Clamp riders with fixing column.....	460 313
1 Candle holders, set of 2.....	459 31ET2
1 Candles, set of 20.....	459 32
1 Lens on rod, $f = + 100$ mm	459 62
1 Lens on rod, $f = + 200$ mm	459 63
1 Diaphragm and slide holder, on rod.....	459 33

Observation

The candle can be imaged on a screen by means of two lenses that are arranged one behind the other.

If the distance between the lenses is increased, the image of the candle on the screen becomes larger.

Evaluation

Systems of several lenses where increasing the distance between the lenses leads to a greater linear magnification are called zoom lenses.

Carrying out the experiment

- Place the diaphragm and slide holder on the back third of the optical bench (at approx. 80 cm), and insert a strip of paper (approx. 5 cm x 10 cm) as film plane.
- Position the candle at a distance of approx. 50 cm from the diaphragm and slide holder, and light it.
- To form the zoom lens, place the lens 1 ($f = + 100$ mm) at a distance of approx. 8 cm and the lens 2 ($f = + 200$ mm) at a distance of approx. 25 cm in front of the diaphragm and slide holder.
- If necessary, shift the lenses slightly for the purpose of focussing the image.
- Slide the lens 2 by approx. 10 cm towards the candle, and observe the image on the paper. If the image of the candle flame is not sharp, slightly change the position of lens 1.