Testing 3 types of laser lens made by different producers.

The focal lengths of lenses and lens systems were measured using the magnification method on the optical bench of the USC using worlds No. 5. The bench consists of a long-focus collimator (f'k = 1600 mm), a illuminator, a set of dashed worlds and a measuring microscope, as well as universal tables and holders for attaching measuring devices and studied components.

A measuring circuit of the above elements is assembled on rectilinear guides provided with a millimeter scale (Fig. 2). Here: 1 - illuminator, 2 - test object, 2 '- image of the test object, 3 - collimator lens, 4 - aperture diaphragm, 5 - component under study, 6 - measuring microscope.

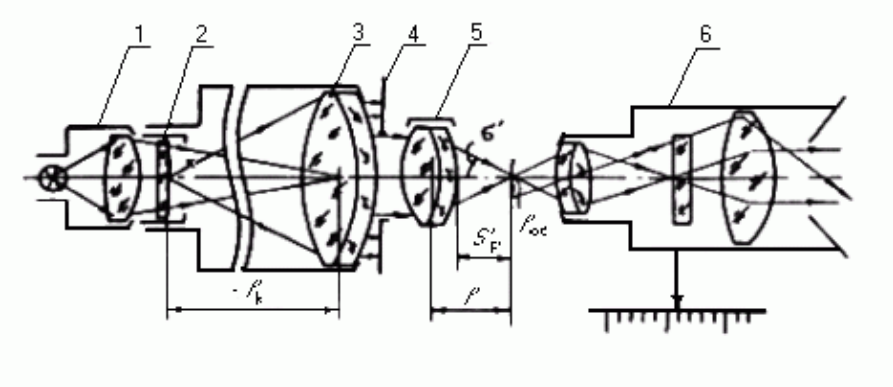

Fig. 2. Optical setup for measuring focal lengths of lenses

The illuminator includes an incandescent lamp (SC-61, RL = 20 W, UL = 8V), a condenser, milk glass and a set of color filters.

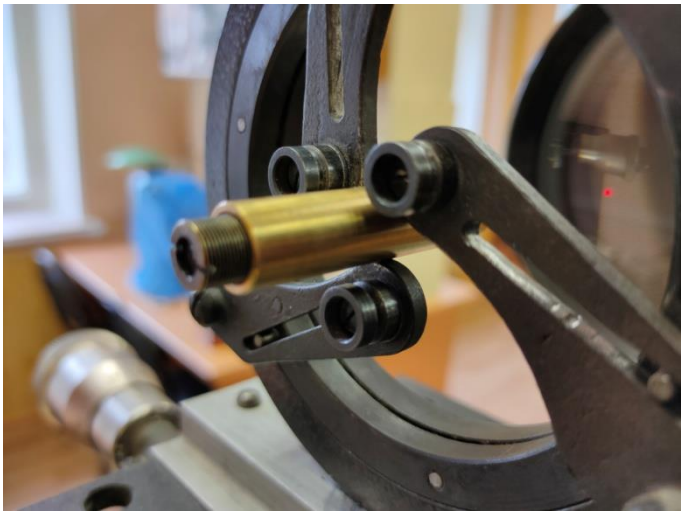

Fig. 3. Measurement of focal lengths of lenses on the optical bench USC

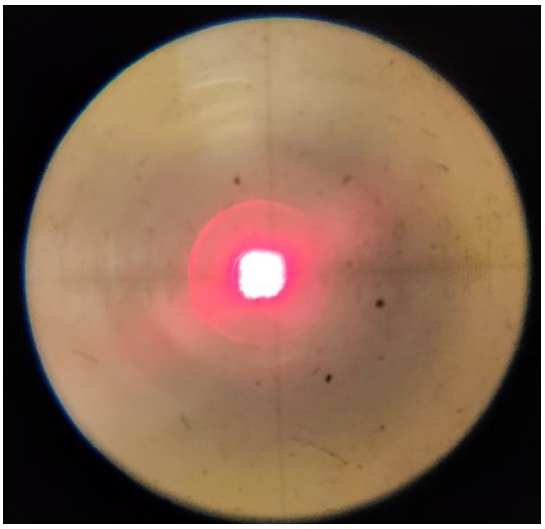

Fig. 4. Measurement of the focal lengths of lenses on the optical bench USC

Focal lengths were determined by the formula:

$$fl = fc \cdot y\,'/\,y, \quad (3)$$

where f'k is the focal length of the collimator (f'k = 1600 mm); y and y 'are the sizes of the test object and its image, respectively.

All lens of each kind have the same focal range parameters.

G7 lens - focal range is 10,1 mm

G2 lens - focal range is 11,78 mm

3 Element lens - focal range is 13,46 mm

№ order	Focal range in mm	Photo of the lens
3 (G7 laser lens)	10,1	
7 (G7 laser lens)	10,1	
9 (G7 laser lens)	10,1	
14 (G7 laser lens)	10,1	
6 (G2 laser lens)	11,78	

10 (G2 laser lens)	11,78	
8 (3 element laser lens)	13,46	
1 (3 element laser lens)	13,47	

A research was made at the Department of Optics, Smolensk Branch of Moscow Power Engineering Institute[1]

[1] http://www.sbmpei.ru/