PACS: 42.00.00

The method of quality control of the alignment of large-sized telescopic optical systems (a review)

A. S. Sushko[1], O. V. Ponin[2], M. A. Simonov[2], I. R. Galyavov[2], M. I. Fokin[2] and D. G. Denisov[1]

[1] Bauman Moscow Technical University
5 2-nd Baumanskaya st., Moscow, 105005, Russia
E-mail: denisov_dg@mail.ru

[2] JSC "Lytkarinsky Optical Glass Plant"
[1] Parkovaya st., Lytkarino, Moscow Region, 140080, Russia

Received 2.04.2023; accepted 17.04.2023

The paper presents an overview of the current state of the quality control equipment for the alignment of large-sized optical systems. A functional optical scheme and a stand design for monitoring the energy concentration of astronomical telescopic systems are proposed. The design was analyzed, dimensional and light-energy calculations were performed, which resulted in a reasonable selection of a matrix radiation receiver. The analysis of the permissible range of angular adjustments of the position of the optical axis of the mirror relative to the axis of the telescopic system is carried out.

Keywords: Energy concentration, control stand, large-sized optical systems, astronomical telescopic systems, scattering spot.

DOI: 10.51368/2307-4469-2023-11-2-167-182

REFERENCES

1. Kirillovsky V. K. and Le Zu Tuan, Optical measurements. Part 6. Innovative directions in optical measurements and research of optical systems, SPb GU ITMO, 2008.
2. Kreopalova G. V., Lazareva N. L. and Puryaev D. T., Optical measurements: Textbook for universities in the specialties "Optoelectronic devices" and "Optical instrument technology" / Under the general editorship of D. T. Puryaev, Moscow, Mechanical Engineering, 1987.
3. Belsky A. B., Gan M. A., Kushnarev K. G. and Larionov S. A., Optical journal, № 10, 35–39 (2010).
4. Shmatko E. V., Makashov M. A. and Makashov D. A. Proc. XV Intern. Scientific and Technical Conf. "Optical Methods of Flow Research", Moscow, June 24–28, 2019, pp. 344–351.
5. Bubis I. Ya., Kanatov Yu. V., Lyubarsky S. V., Soboleva E. K. and Khoroshkeev V. V. Device for quality control of telescopic optical systems Patent № 1293486 of the USSR, IPC G01B 11/24, G01B 9/02, G01M 11/00. № 3983774. Application 03.12.1985. Publ. 28.02.1987.
6. GOST R 58566-2019. Lenses for optoelectronic systems. Test methods: national standard of the Russian Federation : official publication : approved and put into effect by Order of the Federal Agency for Technical Regulation and Metrology dated September 27, 2019 № 818-st : introduced for the first time : date of introduction 2020-09-01 / developed by the Federal State Unitary Enterprise "Scientific Research Institute of Physical Optics, Optics of Lasers and Information Optical Systems All-Russian Scientific Center "State Optical Institute named after S. I. Vavilov" (FSUE "NIIFOOLIOS VNC "GOI named after S. I. Vavilov"). – Moscow, Standartinform, 2019. – 31 p.