

AN AUTOCOLLIMATION CIRCLE READING SYSTEM FOR THE INFRARED MERIDIAN INSTRUMENT

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A new autocollimation circle reading system is proposed for the reflector meridian circle (Nemiro and Streletsky, 1988). The instrument will be used for observations in the K-infrared waveband. Instead of the divided circle fixed to the instrument tube the new system has small spherical mirrors polished at the lateral surfaces of the primary mirror. The primary mirror is made from sital and has an autocollimation system aimed at monitoring its optical axis position. The small spherical mirrors of the circle reading system link the circle readings with the primary's optical axis. The divided circles are fixed unmovable opposite to both lateral surfaces of the primary's optical block. Both surfaces have four spherical mirrors. The distance between the divided circles and the mirrors is equal to the mirrors' radii of curvature. The scales of each circle are illuminated from outside (where the measuring microscopes are placed). The mirrors form autocollimated images of the divisions at the plane of the divisions itself. Averaged coordinates of a division and its autocollimated image give the position of the mirror's optical center, and the semi-difference of the coordinates gives the angular position of the telescope. So, the measurements of the circle positions are differential ones, and any displacements of the microscope zero-points are not critical. The precision of measurements is estimated to be better than 0.05" (random) and 0.005" (systematical). The work was supported by the Russian Foundation of Fundamental Investigations (the project's code is 93-02-17095).

References

A.A.Nemiro, Yu.S.Streletsky, (1988), The Reflector Meridian Circle, *Izv.GAO*, No.205, Leningrad, 15-17.