WORK ON ASTROMETRIC BINARIES IN CHINA*

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Abstract. The investigations of astrometric binary systems, currently carried out in the People's Republic of China, are described and discussed.

1. Introduction

In the early 1900's the Zö-Se Observatory (the Sheshan Station of Shanghai Observatory since 1962) engaged in astrometry of visual binaries with its 40/714 cm twin refractor. Apart from the discovery of new ones, 1122 pairs of J. Herschel binaries were remeasured. In 1960, the Sheshan Station resumed its work on visual binaries. New orbital elements of visual binaries were computed and the method of orbital determination was investigated. 108 pairs of visual binaries have been discovered with the twin refractor.

At present, while continuing the measurement of visual binaries, Yan et al. have collected the elliptic orbital elements of more than 700 pairs of visual binary stars. By means of these elements, the positions are predicted from 1984 to 2003 apparent elliptic orbits are plotted in a rectangular coordinate system with the origin at the primary star, and relative positions of the secondary star are denoted at different time by the calculated orbital ephemerides.

A speckle interferometer attached to the 1.56 m astrometric reflector to measure binaries is being planned at Shanghai Observatory. At the Yunnan Observatory, the same is being made for the measurement of stellar angular diameters as well as of the separation of double stars.

2. Determination of Trigonometric Parallaxes of Selected Double Stars with Appreciable Orbital Motion

The primary research instrument at the Sheshan Station of the Shanghai Observatory will be a 1.56 m astrometric reflector \((f = 15600 \text{ mm}, \text{ scale value } 13.22/\text{mm})\), which was designed for extreme mechanical and thermal stability.

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The telescope was designed to allow photographic measurements of binary stars. The optical calculation showed that the maximum stellar image within a field of $\pm 10'$ is less than 1". The maximum monochromatic light patch is 0'073 in the wavelength range from 4047 to 6563 Å. The primary and secondary mirrors are made of ultra-low-expansion Cer-Vit glass and have been ground by the Shanghai Institute of Optics and Fine Mechanics; the finished mirror is of excellent quality for photographic observations of binary stars.

Future programs at the Sheshan Station with the 1.56 m astrometric reflector will be extended to include the determination of trigonometric parallaxes of selected double stars with appreciable orbital motion.

3. Photoelectric Observations of Stellar Occultations

The occultation technique is presently a useful tool for double star research. The 40 cm, $f/17$ refractor at the Sheshan Station is used for this observation. There are pulse amplifier, discriminator and pulse counter. The integration time is 1 msec. The data-out is printed with a high-speed typewriter. The clock time is established with reference to the coordinate time signals by means of a radio set.

The equipment will be put into routine program observations, including the detection of double and multiple stars.

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