Time synchronization for Bi-static Laser Ranging via Fiber-based Time and Frequency Transfer

Huarong Deng*[1], Zhang Haifeng[1], Long Mingliang[1], Qin Si[1], and Zhang Zhongping[1]

[1]Shanghai Astronomical Observatory of Chinese Academy of Sciences – China

Abstract

Laser echoes can be obviously increased through utilizing multi-telescopes passively receiving the signal while one active station transmits laser, called multi-static laser ranging. The precision of time and frequency synchronization between the active and passive stations have directly influence on data quality. In this paper, the errors of laser data from multi-receiving telescopes were analyzed, and a method of time and frequency synchronization was described basing on fiber-optic time-frequency transfer for multi-receiving telescopes. The performance of fiber-optic time-frequency transfer at bi-static systems at the distance of about 60m was measured with the precision of 68.9 ps The error of range data was less than 10 cm at the experiments of bi-static SLR observations to validate its feasibility.

*Speaker