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ULTRA-HIGH REPETITION RATE OF 100KHZ SATELLITE LASER RANGING AND APPLICATION

Abstract

It presents ultra-high repetition rate of 100kHz satellite laser ranging (SLR) by designing ranging gate with the method of pulse trains, which solves the problem of interference between laser backscattering from atmospheric and satellite's laser echoes under ultra-high repetition rate SLR. An event timer, single-photon infrared detector and other key devices were improved to meet ultra-high repetition rate of 100kHz, under the power of 20W pulse trains picosecond laser in wavelength of 1064 nm and single-photon infrared detector triggered by pulse trains, ultra-high repetition rate of 100 kHz SLR was achieved at the Shanghai observatory with the aperture of 60 cm receiving telescope. The ranging precision was up to a few centimeters, normal point precision was increased an order of magnitude than that in repetition rate of 1kHz SLR. This result will be applied to high-precision measurements for navigation satellites such as Beidou, Galileo, and Glonass, and time comparison between the Chinese Space Station and the ground.