

Satellite Laser Ranging Sky Background Noise Simulation

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The accuracy of satellite laser ranging is affected by skylight background radiation. The presence of skylight background radiation can readily overwhelm the true signal. In this paper, we present a simulation model for satellite laser ranging (SLR) atmospheric radiation transfer (SLRART). The model is capable of calculating the transmission of the laser beam in the atmosphere and the distribution of the sky background radiation in accordance with the parameters of the atmosphere and the SLR system. The finding illustrates that the magnitude of the sky background noise rate from atmospheric scattering is 109 when the observation direction is at a small angle to the Sun. Given that the observing equipment at the San Juan Observatory has not been updated, the signal-to-noise ratio at the Changchun Observatory is approximately fifty times that of the San Juan Observatory, with only the skylight background radiation taken into account.