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Modeling and Simulation of the optical properties of low-speed target in near space

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We present an optical properties modeling method based on the reverse Monte Carlo optical tracking techniques. Some numerical simulations are achieved to demonstrate the accuracy and capability of the proposed modeling method.

Keywords: Near space, reverse Monte Carlo, optical properties, low speed target.

1. Introduction

Near space is the fused tie of variety combat resources of land force, navy, air force and space force. The characteristics analysis of near space target becomes an important foundation of the target detection in near space. The modeling of optical properties of target provides the technical support of analysis and detection in near space [1-2].

In this paper, a novel near space target optical properties modeling method based on the reverse Monte Carlo optical tracking is proposed. Both the environment characteristics in near space and the light transmission characteristics in different detection platform mode are considered and analysis in detail. The invalid light can be eliminated adaptively in this model. According to the phase relationship of target-observing systems-the sun, the optical properties of the target can be obtained. The schematic of radiation of the target in near space is displayed in Fig.1.

![Fig.1 The schematic diagram of the received radiation of the target](image-url)