理论研究

非球形粒子散射光的去偏振特性研究

赵一鸣,江月松

北京航空航天大学电子信息工程学院, 北京　100083

摘要　　目标对入射偏振光的散射特性反映了目标的属性信息。在Rayleigh散射理论的基础上，
通过单层非球形粒子对入射偏振光的散射数学模型，
应用矢量传输方程来计算非球形粒子散射的Mueller矩阵元，求解散射介质的偏振度，讨论在不同介质层厚度、
粒子半径和探测角的条件下，非球形粒子散射光去偏振度的变化特性，
给出了模拟仿真结果。该方法为研究目标的内部结构、
厚度和粗糙度等特征以及目标的探测和识别提供了一种新的途径。

关键词　　非球形Rayleigh粒子　Mueller矩阵　散射光　偏振度

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Depolarization characteristics of scattered light emitted from aspherical particles

ZHAO Yi-ming,JIANG Yue-song

School of Electronic and Information Engineering, Beijing University of Aeronautics and Astronautics, Beijing 100083, China

Abstract The scattering characteristics of the polarized light incident on the target represent the attributive information of the targets. Based on the Rayleigh scattering theory, the Mueller matrix elements of the aspherical particles were calculated by using the vector transmission equation and scattering mathematic model of the incident polarized light scattered by the single-layer aspherical particles, and the polarization degree of the scattering medium was solved. Under the conditions of different thickness, particle radii and detecting angles, the variation characteristics of the depolarization degree of the light scattered by the aspherical particles are discussed, and the simulation result is given. A new way is provided by this method for characterizing the internal structure, thickness, roughness of a target, and for the object acquisition and identification.

Key words Rayleigh aspherical particle　Mueller matrix　scattered light　polarization degree

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通讯作者　赵一鸣 yuesongjiang@vip.sina.com

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