

等离子体涂层椭球目标的电磁散射

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摘要 采用椭球坐标系下的分离变量法, 结合介质和目标的边界条件导出了涂层导体椭球的电磁散射场计算公式, 将入射场、散射场和内场分为轴对称和非轴对称两部分, 数值计算了涂敷椭球粒子的单、双站散射截面的角分布, 讨论了散射截面随入射波频率、等离子体碰撞频率、电子浓度和涂层厚度的变化规律, 对等离子涂层目标的隐身技术研究有一定意义.

关键词 [等离子体](#) [涂覆椭球](#) [电磁散射](#) [碰撞频率](#) [电子浓度](#)

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Investigation on the electromagnetic scattering from the spheroid covered with the plasma

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Abstract

A solution to the electromagnetic scattering problem for core-mantle (two-layered) spheroidal particles is obtained by separation of variables in the spheroidal coordinate system by considering the boundary condition for the dielectric medium and the target. The incident field, the scattered field and the internal radiation field are divided into the axisymmetric and the non-axisymmetric part in this study. The angular distributions of RCS of the backscattering and bistatic scattering from the spheroid covered with the plasma are presented by numerical implementations, and the dependences of RCS on different physical quantities such as the incident frequency, the azimuth angle, the collision frequency, the electron concentration as well as the thickness of the plasma mantle are discussed in detail. The results obtained are of the important significance for the investigation of the core-mantle spheroidal particles covered with the plasma.

Key words [plasma](#) [core-mantle spheroid](#) [electromagnetic scattering](#) [collision frequency](#) [electric density](#)

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