

## 一维带限Weierstrass分形粗糙面透射波散射系数特征研究

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**摘要** 采用一维归一化带限 Weierstrass函数模拟一维分形粗糙面, 根据微扰法研究了粗糙面下方介质2中的电磁散射, 结合分形粗糙面的自相关函数和功率谱导出了不同极化状态下一维带限Weierstrass分形粗糙面透射波散射系数计算公式. 通过数值计算得出了不同极化状态下一维带限Weierstrass分形粗糙面透射系数的分形特征、基本特征、分区特征和随频率变化特征. 结果表明分维、粗糙面高度起伏均方根和入射波频率对分形粗糙面透射波散射系数有显著影响, 在其他条件不变的情况下, 分维越大、粗糙面高度起伏均方根越大、入射波频率越大, 透射系数就越大.

**关键词** [电磁散射](#) [一维带限Weierstrass分形粗糙面](#) [微扰法](#) [透射系数](#)

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## Investigation of characteristics of transmission coefficient from the 1-D band-limited Weierstrass fractal rough surface

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### Abstract

The 1-D fractal rough surface is simulated by employing the 1-D normalized band-limited Weierstrass function, the electromagnetic scattering in medium 2 under a rough surface is investigated and the formulae for the transmission coefficients for different polarizations are presented according to the Small Perturbation Method by considering the autocorrelation function and spectrum of the fractal surface. The fractal characteristics, the basic characteristics, the zonal characteristics and the characteristics with the variation with the frequency of the transmission coefficient from the 1-D band-limited Weierstrass fractal rough surface for different polarizations are obtained by numerical calculation. The numerical results show that the influence of the fractal dimension, the rms of rough surface and the incident frequency on the transmission coefficients of the fractal surface is great and obvious, and in case that other conditions are stationary, the fractal dimension, the rms of rough surface and the incident frequency would be greater, and the transmission coefficient would also be greater. <BR>

**Key words** [electromagnetic scattering](#) [1-D band-limited Weierstrass fractal rough surface](#) [the small perturbation method](#) [transmission coefficient](#)

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