

# **Electromagnetic wave scattering from random rough surfaces in bistatic configuration**

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Remote sensing applications require developing accurate models to predict radar bistatic scattering from rough surfaces. Numerous approximate analytical methods have been developed and have been successful for analyzing scattering from certain classes of surfaces. In this context, we have proposed an improved two-scale model (TSM) for electromagnetic bistatic scattering from sea surface.

The simplest TSM combines the first order small perturbation method (applicable to surfaces with small roughness) with Kirchhoff Approximation (used for large degree of roughness). It has broader range of validity but is inaccurate for grazing angles and there is a gap in regions of validity of SPM1 and KA. Moreover, the predictions for cross-polarization in backscattering are not exact. We study the SPM up to second order which yield non-zero results for cross polarizations in backscattering and give larger domain of frequency and then add the second order SPM contribution to SPM1 to develop an improved TSM. The calculations are made by assuming the Gaussian spectrum and the surface height spectrum of Elfouhaily et al. for fully developed seas. The results are validated by comparing them with published experimental data and SSA.