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Study of the Electromagnetic Scattering from the Very Rough Fractal Sea Surface

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Abstract: In this paper, based on the fundamental formulae of the first-order and second-order Kirchhoff approximation and with consideration of the shadowing effect, the backscattering enhancement of the one-dimensional very rough fractal sea surface with Pierson-Moskowitz spectrum is studied under the second-order Kirchhoff approximation at microwave frequency. The numerical results are compared with those of the first-order Kirchhoff approximation and integral equation method. The dependencies of the bistatic scattering cross section and the backscattering enhancement on the incident angle, fractal dimension, and windspeed over the sea surface are analyzed in detail.

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Key words: very rough fractal sea surface, electromagnetic scattering, second-order Kirchhoff approximation, backscattering enhancement

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