Nanooptics and photonics

Optical diffraction from deterministic and random fat fractals

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The optical Fourier transform (OFT) is considered for determination of the basic structural characteristics of deterministic and random fat fractals. We show that within the model, for deterministic fractals, OFT allows us to determine both, the fractal dimension at each structural level, as well as the scaling factors at each iteration. However, for the case of random fractals, the intensity is smeared out, and thus only the fractal dimensions are available. This is in agreement with the general results obtained in the context of small-angle scattering from a system of randomly oriented, non-interacting nano fractals. We explain how the structural properties can be obtained experimentally and show how they are correlated to variation of the scaling factor with the iteration number.

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