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Boundary layer method for solving full Maxwell equations in the presence of an electromagnetic inhomogeneity of small diameter. (English) Zbl 1478.78011

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Summary: We consider solutions to the time-harmonic Maxwell's equations in two and three dimensions. For such solutions we derive high-order terms in the asymptotic expansions of the perturbations resulting from the presence of diametrically small electromagnetic inhomogeneity with parameters different from the background medium. Our study is rigorous and is founded on layer potential techniques. Our formulas may be awaited to head effective computational identification algorithms, aimed at reconstructing small dielectric object from electromagnetic boundary measurements.

MSC:

- 78A25 Electromagnetic theory (general)
- 78M15 Boundary element methods applied to problems in optics and electromagnetic theory
- 35B20 Perturbations in context of PDEs
- 35C20 Asymptotic expansions of solutions to PDEs
- 35J46 First-order elliptic systems
- 35Q61 Maxwell equations

Keywords:

full Maxwell's equations; electromagnetic inhomogeneity; electromagnetic potentials; asymptotic formula

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