

Dielectric ring as an analog of a magnetic dipole in GHz magnetic field

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We have demonstrated that a dielectric plane ring with a high permittivity excited by an incident plane electromagnetic wave in the GHz frequency range, is an almost ideal magnetic dipole for the basic resonance of incident radiation scattering. The scattering fraction of all other multipoles is insignificant and is less than 2×10^{-3} of the main magnetic dipole resonance. Experimentally measured magnetic field distributions near the ring are consistent with the results of computer simulation and the Biot-Savart-Laplace law. Thus, the Biot-Savart-Laplace law can be applied both to calculate conductive structures based on metal rings and to calculate non-conductive structures based on dielectric rings with low losses at GHz frequencies.