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Scattering of an Incident Beam by a Magnetic Structure using FDTD. MIGUEL A. ALVAREZ-CABANILLAS, Instituto Politecnico Nacional, CITEDI. — The electromagnetic scattering by a magnetic structure is modeled using finite difference time domain (FDTD). The electromagnetic wave with normal incidence to the magnetic structure has a plane wave front. The incident electric field is chosen perpendicular to the magnetization in the magnetic structure. The electric field is rotated by the magneto-optical Kerr effect (MOKE) and then reflected. This phenomenon is simulated by building the algorithm for FDTD from the Maxwell's equations, using a Transversal Magnetic distribution of the fields in the numerical mesh. The MOKE is introduced in the dielectric constant of the magnetic material. The space of simulation is surrounded by an absorbing boundary condition (ABC). The Perfect Match Layer (PML) was chosen as an ABC with ten layers, enough to reduce the reflected wave. The same size of cells were used in the while mesh. The size of the cells in the space of simulation and the time step were selected in agreement to reduce the numerical dispersion and avoid numerical instability. The algorithm simulates the correct rotation of the electric field as was predicted by MOKE. The numerical results of the FDTD were compared with the analytic solution in order to verify the algorithm and validate the numerical results.

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