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Soft-and-Hard/D'B' Boundary Conditions and their Realization by Electromagnetic Media

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A layer of uniaxial medium with large axial permittivity and permeability can be used as a quarter-wave transformer with interesting properties. By increasing the transverse permittivity and permeability the transformer becomes a thin sheet. It is shown that the recently introduced SHDB boundary conditions, generalizing the soft-and-hard and DB conditions, realized by the interface of a skewon-axion medium, can be transformed to form a novel class of SHD'B' boundary conditions which generalizes the soft-and-hard and D'B' boundary conditions. Reflection of a plane wave from a planar SHD'B' boundary is considered by numerical examples revealing an interesting narrow beam with radical change of reflection for certain values of parameters and incidence angles.

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