



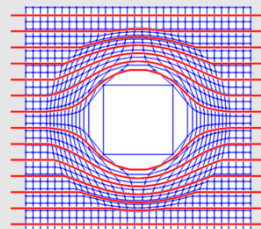
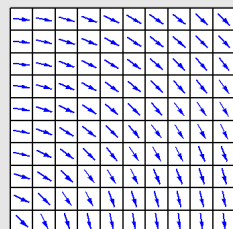
Advanced Electromagnetics:
21st Century Electromagnetics

Introduction to Transformation Optics

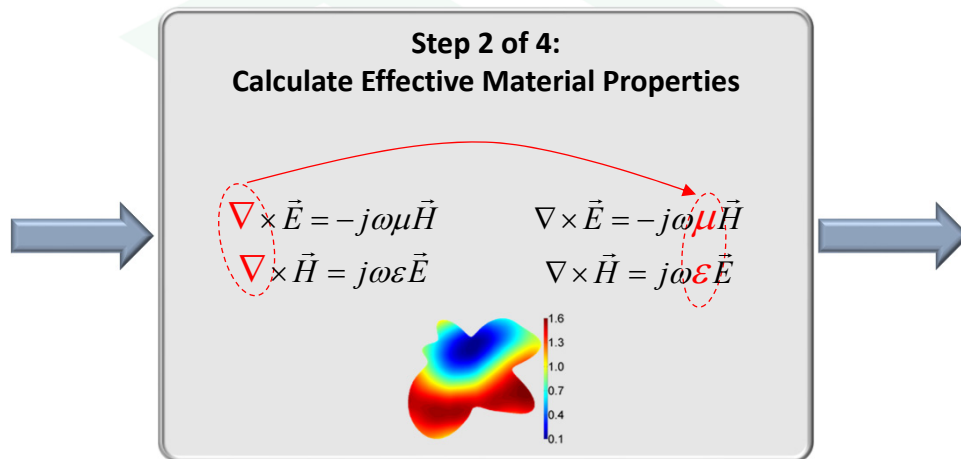


Design Process Using Transformation Optics

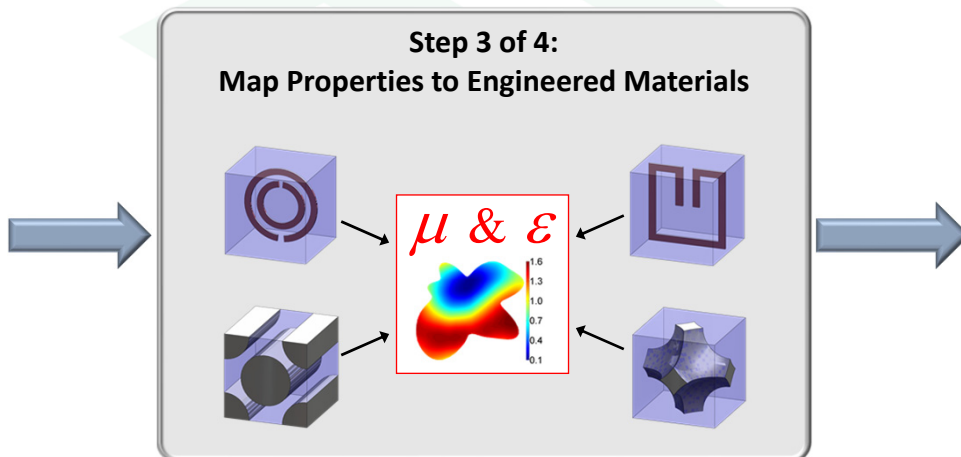
**Step 1 of 4:
Define Spatial Transform**



Design Process Using Transformation Optics

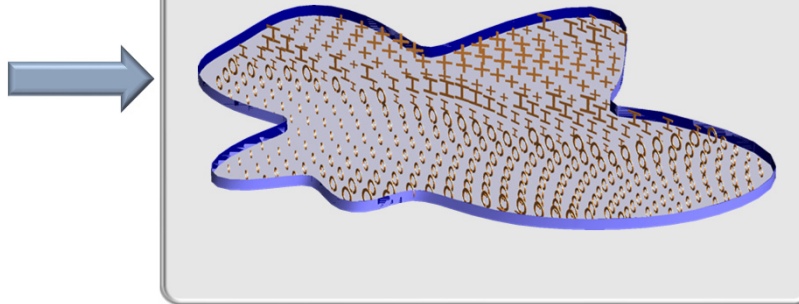


Design Process Using Transformation Optics

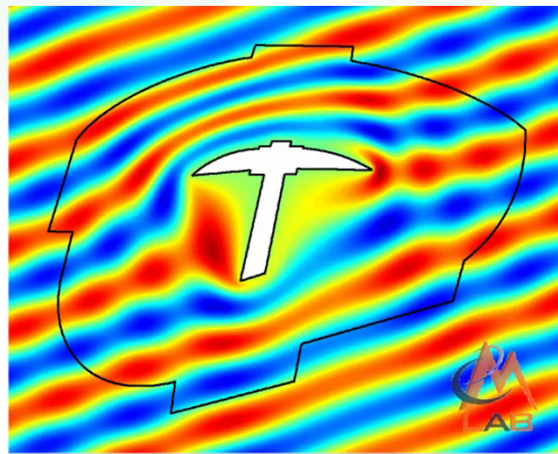


Design Process Using Transformation Optics

**Step 4 of 4:
Generate Overall Lattice**



Simulation of a Transformation Optics Cloak



Notes

- Transformation optics (TO) is a coordinate transformation technique where the math of the transform is “absorbed” into the permittivity $[\epsilon]$ and permeability $[\mu]$ functions.
- The method applies to any frequency, not just optical frequencies.
- The method produces the permittivity $[\epsilon(\vec{r})]$ and permeability $[\mu(\vec{r})]$ as a function of position.
- The method does not say anything about how the materials will be realized.
- The resulting material functions are typically anisotropic and require permittivity and permeability with extreme values. This leads to structures requiring metals.
- TO is also sometimes called transformation electromagnetics (TEM).