

# **Metamaterials and the science of invisibility**

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In the last decade a new area of research has emerged as a result of our ability to produce materials with entirely novel electromagnetic properties. Known as metamaterials because they take us beyond the properties of conventional materials, they display remarkable effects not found in nature, such as negative refraction.

Spurred on by these new opportunities, theorists have produced exotic concepts that exploit the new materials: we can now specify how to make a lens whose resolution is limited not by the laws of nature but only by our ability to build to the stated specifications; we can guide radiation along a trajectory, avoiding objects and causing them to appear invisible; we can design and manufacture materials that are active magnetically in the optical range.

There has been a truly amazing amount of innovation but more is yet to come. The field of metamaterials is developing into a highly disruptive technology for a plethora of applications where control over light (or more generally electromagnetic radiation) is crucial, amongst them telecommunications, solar energy harvesting, stealth, biological imaging and sensing, and medical diagnostics.