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Invisibility: a first draft

Cloaking called theoretically feasible

CATHERINE CLABBY, Staff Writer

Ever wish to slip unseen into forbidden places the way Harry Potter does under his invisibility cloak?

Or to materialize with no warning like Romulan warships in a Star Trek universe?

Now scientists at Duke University and Imperial College in London say such dreams are nearly within reach.

In a paper published online today by the journal *Science*, the Duke team delivers a blueprint for a real cloaking device. No one has the means, yet, to produce it. But for the first time, science has moved far enough to make one theoretically feasible, the scientists say.

"People are beginning to think differently," said Duke engineering professor David R. Smith.

Working with Sir John Pendry in London, Smith and fellow Duke physicist David Schurig envision new materials that could bend light around an object, creating the illusion that the object isn't there.

And they provide a detailed description of the qualities the new materials would need.

The three scientists come by this vision honestly. They are leading theorists and tinkerers in a new field creating "metamaterials." Borrowing building blocks and ultra-precise fabrication techniques from the electronics industry, they invent materials that break the laws of nature.

One example is the way invisible light bends after hitting surfaces. Not long ago, scientists thought this refracted light always goes in a predictable direction. But in 2000, Smith's team introduced a gridlike material that bends it in an unexpected way.

Many physicists were skeptical, even critical. But in 2003, after several labs confirmed the finding, *Science* listed it as one of the 10 research breakthroughs of the year. Smith, Pendry and collaborators won the European Descartes Research Prize.

In a second-floor lab at Duke's Pratt School of Engineering, they continue to build and test novel materials -- some gridlike structures, others flat. Funded partly by the Department of Defense, they see countless applications for products that might result.

Materials that make other objects invisible could do more than hide a spy plane, Schurig said. They could keep an ugly building -- say a coal plant -- from spoiling a beautiful view. Other sorts of cloaks could deflect destructive seismic waves or dangerous radiation from buildings, he said.

Greg Gbur, a UNC-Charlotte physicist who has read the Duke blueprint and an alternative design also published by *Science*, said huge challenges remain.

But "this shifts the idea of these devices from being intriguing but not really feasible to maybe being feasible," Gbur said.

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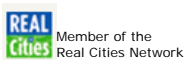
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