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How UCF may make Harry Potter's invisibility cloak … seriously

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What kind of alchemy is this?

A team of researchers at the **University of Central Florida** is getting closer to creating the invisibility cloak from Harry Potter book and movie series — and local companies are already interested in its commercialization.

That is a sentence I always hoped I would get to write. And I solemnly swear I am up to no good.

Here's the basics: The idea is that you can bend light around an object to render it essentially invisible. It may sound like science fiction, but the science is sound. Debashis Chanda, an assistant professor at UCF, has been working on the science for the last decade.

Up to this point, researchers have only been able to bend light at the five to 10 micron levels, materials the size of a tenth of a hair. In the cover story in the March edition of the Advanced Optical Materials journal, Chanda and fellow optical and nanotech experts were able to develop a larger swath of multilayer 3-D metamaterial operating in the visible spectral range, specifically a 4-inch by 4-inch piece.

"We broke that limit," Chanda said.

Here's the actual science parts, which I am going to quote directly because it's so far above my meager understanding of science, I don't want to muck it up:

"The nanotransfer printing technique creates metal/dielectric composite films, which are stacked together in a 3-D architecture with nanoscale patterns for operation in the visible spectral range. Control of electromagnetic resonances over the 3-D space by structural manipulation allows precise control over propagation of light. Following this technique, larger pieces of this special material can be created, which were previously limited to micron-scale size.

"By improving the technique, the team hopes to be able to create larger pieces of the material with engineered optical properties, which would make it practical to produce for real-life device applications. For example, the team could develop large-area metamaterial absorbers, which would enable fighter jets to remain invisible from detection systems."

Currently, the nanomaterials can bend light in the red and blue spectrum, not the full visible light spectrum. So the cloak is a few years away. But the technology has applications in making solar cells more efficient as well.

“We’re not there yet,” Chanda said. “We could make, say, a stealth technology for a fighter jet.”

Chanda said he’s already received interest from local companies interested in funding more research and possibly commercializing it, including Lockheed Martin. While we’re still a few years out from actual applications, a boost in funding could shorten that time frame.

Check here for Chanda’s website. Chanda worked on the project with the following team: Li Gao, Youngmin Kim, Kazuki Shigeta, Steven Hartanto and John Rogers from the **University of Illinois** at Urbana-Champaign; Abraham Vasquez-Guardado and Daniel Franklin from UCF: Christopher J. Progler from **Photronics** Inc. and Gregory R. Bogartfrom the **Sandia National Laboratories**.

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