

# CLOAKING MYTHS AND REALITIES

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## Don't cloaks already exist at visible light?

To cloak is to conceal. That means a mirror; a black robe; and even camouflage, represent cloaking methods. Obviously people know how to cloak things. Just play 'hide and seek'. However, most people think of invisibility when cloaking—as in visually disappearing through transparency or '*see thru*'. Ergo 'invisibility cloak' equals 'see-thru cloak' —for the eye. This doesn't exist at present, at least not one that is anything but microscopic, and deals with all colors.

The closest to being 'see-thru' is with '*projection cloaking*', where cameras are used to project a view to the other side, and visa versa. A jacket may have a projection screen fabric impregnated with LED's, and pinhole cameras, for example. Projection cloaking is powered or 'active', and has had some success, at least from what can be seen publically. Batteries not included.

'*Mirror cloaks*' use mirrors or concatenated high refraction optics to mirror-back the view and thus hide the object. Step behind a mirror—you're cloaked!

## Wideband Cloaking —is it new?

Yes. For metamaterials, but not projection cloaks. Projection cloaks are powered and complicated. Metamaterial cloaks are passive (no power) and can be just that—material.

## Visible light invisibility cloaks are going to be announced anyday...

Where is it? A '*see-thru visible light cloak of metamaterials*' that can hi-fidelity cloak more than a pinhead—wideband or not—is not in the offing. Hold the scientist(s) who led you to that conclusion accountable for this statement of irrational exuberance. Or ask why they are confusing 'mirror cloaks' (they are actually a form of Eaton-Lippman lens) with 'see-thru cloaks'. One is easy, and does nothing that optics can't already do, and the other is very, very, hard. A covering you wear that cloaks you to the eye, with no power or fancy electronics, is not there....

## Cloaks can cancel light and make lasers not work

This sounds much like a prediction from Nikola Tesla circa 1930....not all 'visions' become reality. There is a difference between 'science' and 'engineering'. Sometimes it happens, sometimes it doesn't. Room temperature superconductors, for example, didn't happen—and it's been more than 20 years, yet the 'science' of high temperature superconductors was a major breakthrough. Sometimes science precedes the engineering by decades. Witness Einstein's exposition on 'stimulated emission' versus Gordon Gould's invention of the laser. Decades. (And Gould's story would make a great movie!)

### Metamaterial cloaks are extraterrestrial technology from UFO's

It is great entertainment to see the UFO clips of allegedly alien spacecraft, especially the ones described as 'cloaked'. If these are alien spacecraft—which is extraordinarily unlikely—then our space brothers and sisters are rather poor engineers, because the 'cloaking' didn't work well enough to hide the evidence. Actually, 'metamaterials', as closely spaced periodic structure, have been around for 90 years. Marconi and Franklin secured a patent on them. 1919. In other words, there are plenty of smart people around and it is a bit of an insult to assume that exotic technology is cheerfully ripped off from Little Green Men. Some of our colleagues may act like they are from another planet, but most engineers and physicists are pretty well grounded to Terra Firma.

### It's just a matter of time before we all will wear cloaks

Probably . Say, in 100 years.

### Buildings will be cloaked to let cell phone signals go around them?

This makes no sense. The cost, profile and visual constraints would just be silly. It's infinitely easier to use 'picocells' or some other form of repeater.

### There are no practical uses for a microwave cloak

That's not clear. Although microwave cloaking can and does work, there are often alternative ways to accomplish the same task or tasks, often simpler, cheaper, and with technology that's been around for a while. See the previous question, for example.

### Metamaterials and cloaks will change the world

**It is too early to predict what the true 'killer apps' will be. The 'irrational exuberance' already mentioned has listed lots of possibilities, but possible is not always probable. To date there has been no useful application of wideband metamaterials. That will change.**