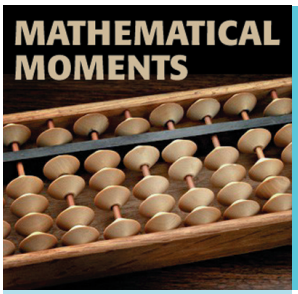

Tripping the Light–Fantastic

Invisibility is no longer confined to fiction. In a recent experiment, microwaves were bent around a cylinder and returned to their original trajectories, rendering the cylinder almost invisible at those wavelengths. This doesn't mean that we're ready for invisible humans (or spaceships), but by using Maxwell's equations, which are partial differential equations fundamental to electromagnetics, mathematicians have demonstrated that in some simple cases *not* seeing is believing, too.

Part of this successful demonstration of invisibility is due to *metamaterials*– electromagnetic materials that can be made to have highly unusual properties. Another ingredient is a mathematical transformation that stretches a point into a ball, "cloaking" whatever is inside. This transformation was discovered while researchers were pondering how a tumor could escape detection. Their attempts to improve visibility eventually led to the development of equations for invisibility. A more recent transformation creates an optical "wormhole," which tricks electromagnetic waves into behaving as if the topology of space has changed.

We'll finish with this:

For More Information: "Metamaterial Electromagnetic Cloak at Microwave Frequencies," D. Schurig et al, *Science*, November 10, 2006.

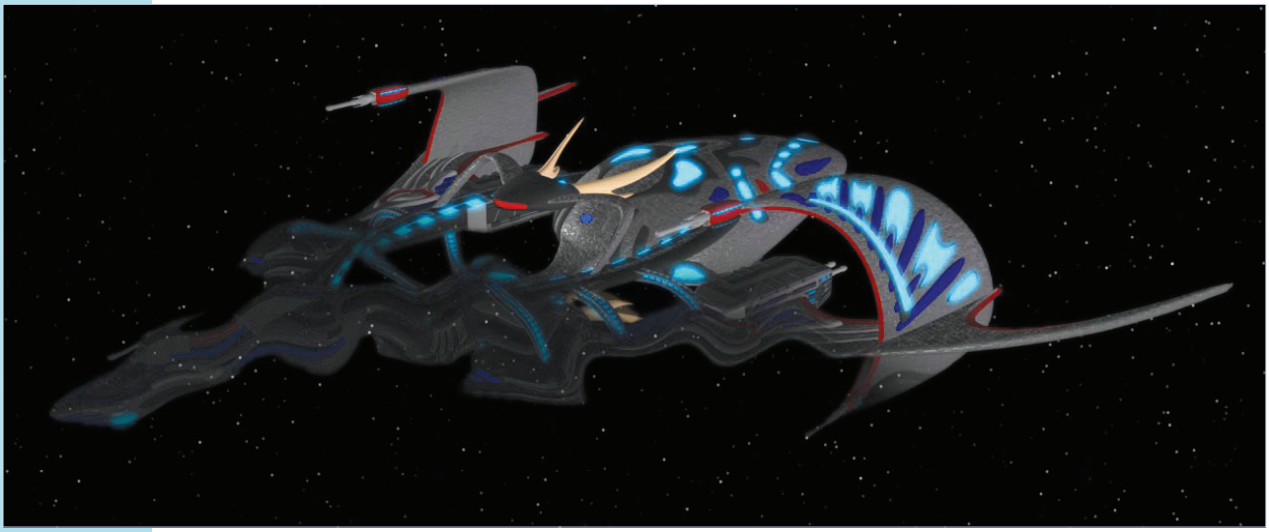

Image courtesy of Michael Bozec

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