Why 'event cloaks' could be the key to the ultimate bank heist

July 1 2011

In this month's special issue of *Physics World*, which examines the science and applications of invisibility, Martin McCall and Paul Kinsler of Imperial College London describe a new type of invisibility cloak that does not just hide objects – but events.

Using the ultimate bank heist as an example, McCall and Kinsler explain how a thief could, in principle, use an "event cloak" to steal money from a safe, without even the CCTV surveillance cameras being aware.

The burglar would somehow need to split all the light approaching the safe into two parts: "before" and "after", with the "before" part sped up and the "after" part slowed down.

This would create a brief period of darkness during which the burglar could enter the scene and steal the money, being careful to close the safe door before they leave.

With the safe-cracker gone, the process of speeding up and slowing down the light would then be reversed, leading to an apparently untouched scene once again.

Robbing a bank is, of course, only an example to illustrate the principle of what an event cloak could do. As McCall and Kinsler explain, a more likely application of a full-size event cloak would be to control the flow of signals in an optical routing system, where one may need to process simultaneous uninterrupted signals at the same time.

For these aspirations to become a reality, suitable materials need to be developed that can manipulate the light to speed it up or slow it down. The consensus seems to be that a set of parallel, artificially structured "metamaterial" layers would be needed, each containing an array of tiny metallic elements that can be controlled to dynamically adjust the speed of light passing through.

If a high-performance, macroscopic-size, fully functional space–time cloak could be developed, one potential "party trick" could be a Star Trek-type transporter, in which a person could appear to instantly relocate from one point to another.

Although no-one has yet tried to build a space–time cloak in the lab, McCall and Kinsler argue that "there is no obvious reason why such a cloak could not be achieved quite soon, perhaps even within a few years".

More information: *Physics World*: www.physicsworld.com/

Also in this month's special issue on invisibility.

- Invisibility is now a reality, but scientists are not satisfied and are still searching for the holy grail – a cloak of invisibility that can hide macroscale objects from view at any angle, using unpolarized visible light. Wenshan Cai and Vladimir Shalaev map out the road ahead on this mission.

- The quest to achieve true invisibility has inspired ambitious goals beyond merely cloaking visible light. Ulf Leonhardt takes a light-hearted look at the top five possible spin-offs from invisibility science.

- Tales of invisible people and magical invisibility-bestowing objects have thrilled us for millennia. Sidney Perkowitz reveals how these myths and fantasies are now becoming a reality.

Provided by Institute of Physics