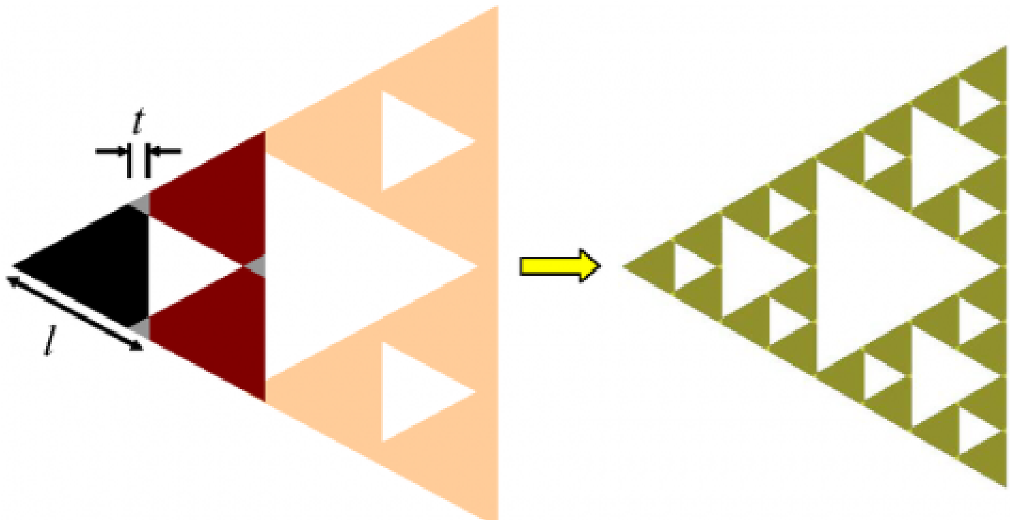
Researchers create novel nanoantennas

May 4 2011



(PhysOrg.com) -- A team of plasmonics researchers has developed a novel type of nanoantenna that could lead to advances in drug and explosives detection.

An international team of plasmonics researchers has developed a novel type of nanoantenna that could one day lead to advances in security applications for the detection of drugs and explosives.

A report of the finding, authored by Swinburne University's Professor Saulius Juodkazis and Dr Lorenzo Rosa with a collaborator from China, has been published in the scientific journal *Physica Status Solidi: Rapid*

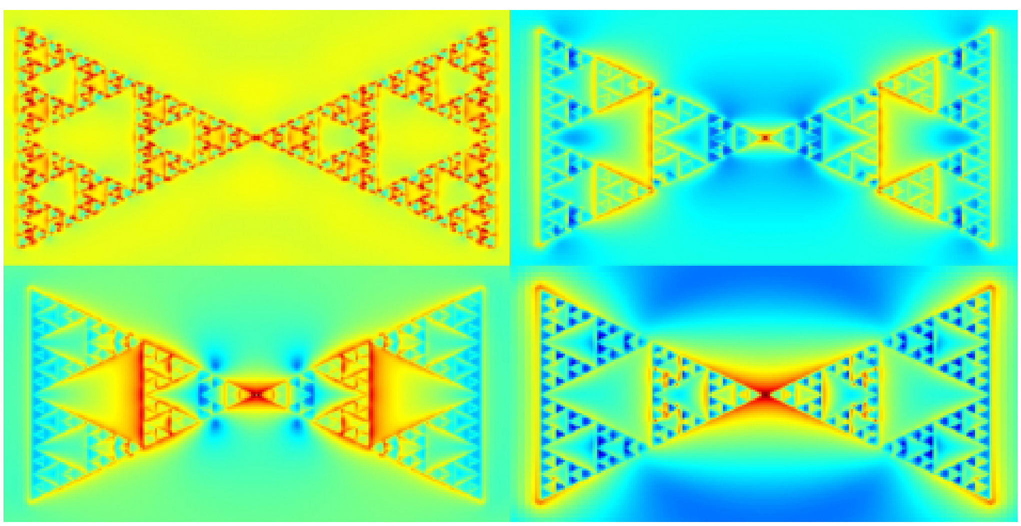
Research Letters.

Nanoantennas work in much the same way as regular antennas, except they collect light instead of radio waves and are millions of times smaller.

The reason that Professor Juodkazis' nanoantennas are so unique is that they are fractal – that is they consist of repeating patterns, with the shape of the smallest feature replicated to make identical, yet larger structures.

"Self-replication is an interesting design that is often found in nature. For example, you will see it on some sea shells," he said.

This fractal approach means that the researchers' nanoantennas can be scaled down to a very small size, or scaled up to be the width of a human hair – which in nanophotonics terms is extremely large.



“Once we have the smallest bit fabricated there are no restraints, we can just replicate it and make it larger,” Professor Juodkazis said. “This is something that has been very difficult to achieve up until now. If scientists wanted a larger structure, they would just have to fabricate one.”

“In a sense we have been able to create a customisable nanoantenna that can be used for different applications, making it a very cost effective structure.”

This new type of nanoantenna has many potential applications, such as the development of new types of drug and explosives detection kits.

“The different chemicals found in drugs and explosives are detectable at very specific wavelengths. Nanoantennas are able to recognise these, and in turn identify specific types of drugs and explosives,” Professor Juodkazis said.

While he is pleased with the developments to date, he expects he will be able to extend his nanoantenna research even further when Swinburne’s new plasmonics lab is completed in late 2011.

Provided by Swinburne University of Technology

Citation: Researchers create novel nanoantennas (2011, May 4) retrieved 20 April 2024 from https://phys.org/news/2011-05-nanoantennas.html