Researchers camouflage an optical chip rendering it invisible

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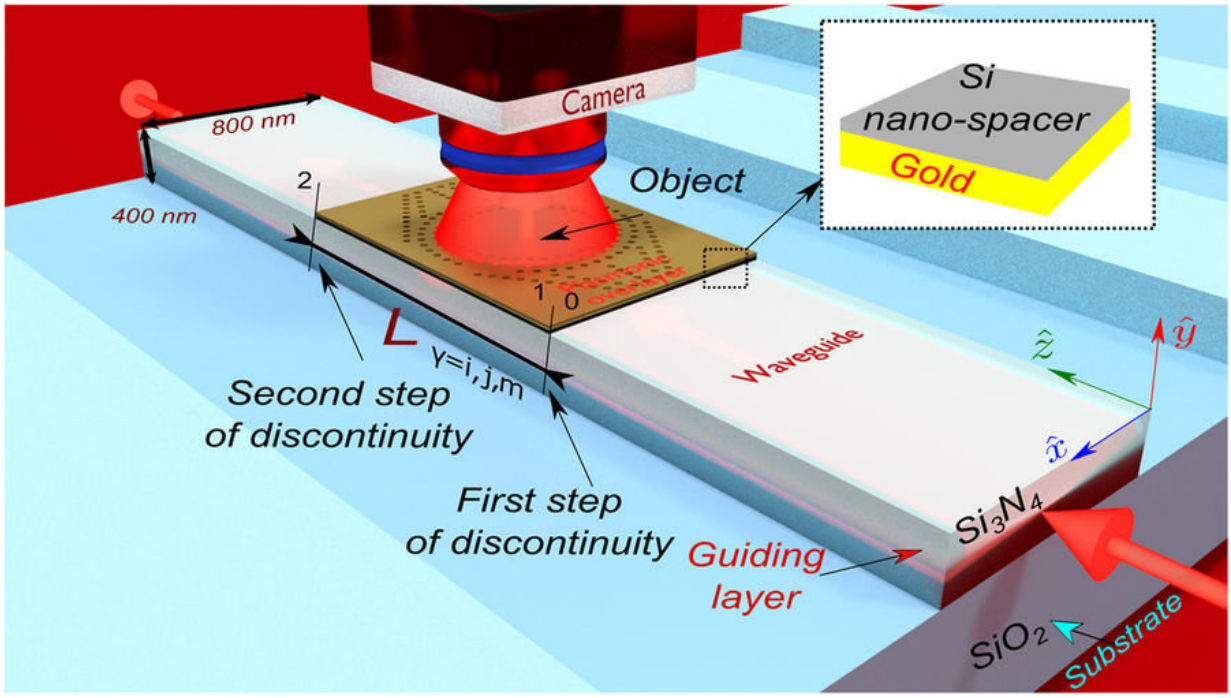

Illustration of the composite plasmonic waveguide structure and materials to study the invisibility cloaking scheme. Wavelength of $\lambda_0 = 637$ nm illuminates the dielectric waveguide exciting the fundamental mode guided in region 0. Region 1 is characterized by the metasurface and Si nano-spacer placed on the waveguide with length L in the propagation direction exciting three hybrid plasmonic modes. Region 2 is identical to the region 0 in terms of the optical properties and functionality. A scattering object with optical index of 1.3 is placed on the metasurface. Credit: *Scientific Reports* (2017). DOI: 10.1038/s41598-017-10578-6

Ben-Gurion University of the Negev (BGU) researchers have achieved a breakthrough in manipulating light to render an object, such as an optical chip, invisible.

According to the recent study published in *Nature Scientific Reports*, the researchers conceived a new method that deflects and scatters light away from a "cloaking" chip surface so it is not detected.

An operational cloaking chip can be an extension of the basic technologies such as radar-absorbing dark paint used on stealth aircraft, local optical camouflage, surface cooling to minimize electromagnetic infrared emissions, or electromagnetic wave scattering.

"These results open the door to new integrated photonic devices, harnessing electromagnetic fields of light at nanoscale for a variety of applications from on-chip optical devices to all-optical processing," says Dr. Alina Karabchevsky, head of BGU's Light-on-a-Chip Group and a member of the BGU Unit of Electro-Optical Engineering and the Ilse Katz Institute for Nanoscale Science and Technology.

"We showed that it is possible to bend the light around an object located on the cloak on an optical chip. The light does not interact with the object, thus resulting in the object's invisibility."

The next step is for researchers to overcome the significant challenge of developing a prototype.

More information: Yakov Galutin et al, Invisibility Cloaking Scheme by Evanescent Fields Distortion on Composite Plasmonic Waveguides with Si Nano-Spacer, *Scientific Reports* (2017). DOI: 10.1038/s41598-017-10578-6