Surface-plasmon Index Guided Waveguides
Technology #10850

Applications

This invention can be used in nanophotonics, ultrafast optics, optical memories, and quantum computing. Surface-Plasmon waveguides have the ability to guide light in a dielectric region of low refractive index (such as air), when surrounded by dielectric regions of higher refractive index. This property of such plasmonic waveguides is extremely useful as it allows for the creation of air channels, where light can be confined. Therefore such waveguides and cavities can be very useful to applications of plasmonic nano-sensing, such as biosensors, wherein a molecule or nanoparticle is streamed through this air channel and a significant detectable change in the plasmonic-light properties occurs.

Problem Addressed

Conventional methods of guiding light are limited because they have a fairly small frequency bandwidth and high propagation losses. There is a need for a more efficient waveguide that can be used over a wide range of frequency regimes.

Technology

This invention presents a new class of surface plasmon waveguides. The basis of these structures is the presence of surface plasmon modes, supported on the interfaces between the dielectric regions and the flat unpatterned surface of a bulk metallic substrate. The SP waveguides can simultaneously shrink length, time and energy scales, allowing for easy coupling over their entire bandwidth of operation. This attribute enables the design of nanoscale SP-enabled optical micro-cavities.

Advantages

- It can be used for many frequency regimes (from GHz and lower, to optical)
- It can operate with minimal absorption losses, limited only by the intrinsic loss of the metallic substrate

Categories For This Invention:

Materials
Micro & Nanotech
Nanomaterials
Nanotechnology
Photonics
Data Communications
Intellectual Property:
Surface-plasmon index guided (SPIG) waveguides and surface-plasmon effective index guided (SPEIG) waveguides
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Inventors:
John Joannopoulos
Yoel Fink
Marin Soljacic
Mihai Ibanescu
Aristeidis Karalis
David Chan
Elefterios Lidorikis

Publications:
Surface-Plasmon-Assisted Guiding of Broadband Slow and Subwavelength Light in Air
Physical Review Letters
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External Links:
Joannopoulos Research Group
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Fibers@MIT
http://www.rle.mit.edu/pbg/

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