About

Tools

Developers

Help

Europe PMC plus

Search life-sciences literature (41,982,302 articles, preprints and more)

Advanced search

Abstract

Figures

Free full text ▶

Citations & impact

Data

Similar Articles

Funding

Highly tunable hybrid metamaterials employing split-ring resonators strongly coupled to graphene surface plasmons.

Liu PQ¹, Luxmoore IJ², Mikhailov SA³, Savostianova NA³, Valmorra F¹, Faist J¹, Nash GR²

Author information >

Nature Communications, 20 Nov 2015, 6:8969

DOI: 10.1038/ncomms9969 PMID: 26584781 PMCID: PMC4673875

Free to read & use ②

Share this article

Abstract

Metamaterials and plasmonics are powerful tools for unconventional manipulation and harnessing of light. Metamaterials can be engineered to possess intriguing properties lacking in natural materials, such as negative refractive index. Plasmonics offers capabilities of confining light in subwavelength dimensions and enhancing light-matter interactions. Recently, the technological potential of graphene-based plasmonics has been recognized as the latter features large tunability, higher field-confinement and lower loss compared with metal-based plasmonics. Here, we introduce hybrid structures comprising graphene plasmonic resonators coupled to conventional split-ring resonators, thus demonstrating a type of highly tunable metamaterial, where the interaction between the two resonances reaches the strong-coupling regin Such hybrid metamaterials are employed as high-speed THz modulators, exhibiting ~60% transmission modulation and operating speed in excess of 40 MHz. This device concept also provides a platform for exploring cavity-enhanced lightmatter interactions and optical processes in graphene plasmonic structures for applications including sensing, photodetection and nonlinear frequency generation.

Figures

Free full text

Citations & impact

Data

Similar Articles

This website requires cookies, and the limited processing of your personal data in order to function. By using the site you are agreeing to this as outlined in our privac cookie policy.

Follow us





Twitter

YouTube

About

Outreach

About Europe PMC Funders Become a funder Governance Roadmap

Tools

Tools overview
ORCID article claiming
Journal list
Grant finder
External links service
RSS feeds
Annotations

Annotations submission service

DevelopersDeveloper resou

Developer resources
Articles RESTful API
Grants RESTful API
API case studies
SOAP web service
Annotations API
OAI service
Bulk downloads
Developers Forum

Help

Help using Europe P
Search syntax refere
Contact us

Let us know how we are doing.

Europe PMC is part of the ELIXIR infrastructure

Europe PMC is an ELIXIR Core Data Resource Learn more >

Europe PMC is a service of the Europe PMC Funders' Group, in partnership with the European Bioinformatics Institute; and in cooperation the U.S. National Library of Medicine (NCBI/NLM). It includes content provided to the PMC International arch

Europe PMC is a GBC global core biodata resource.

Contact us | Privacy | Terms of use | Copyright | Accessibility