

Editorial on Advanced Optics

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0 Introduction

Optics is the field of science and the area encompassing the physical phenomena and technologies associated with generation, transmission, manipulation, detection and utilization of light. In recent decades, optics research has flourished with the invention of the laser, which increased the interaction between optics and electronics. There are still plenty of improvements and advances yet to be made. Below are few of numerous advanced research which will support us in moving forward.

1 Wi-Fi using Laser Frequency

Researchers at Harvard John A. Paulson School of Engineering and Applied Sciences (SEAS) discovered a new method for an infrared frequency comb in a quantum cascade laser could offer a new way to generate terahertz frequencies. Scientist has uncovered a new phenomenon of quantum cascade laser frequency combs, which would allow these devices to act as integrated transmitters or receivers that can efficiently encode information.

2 Changing Electromagnetic Effects through Light

Experts at Duke University have built the first metal free, dynamically tunable metamaterial for controlling electromagnetic waves. This method could form the basis for technologies ranging from improved security scanners to new type of visual displays.

3 Superman's laser vision is a step closer

Superman's ability to shoot laser beams from his eyes has come a step closer to reality, with the new discoveries by the scientist team at the University of St. Andrews.

Lasers on the eye – ocular lasers – may be now possible with the development of an ultra-thin membrane laser using organic semiconductors. They could be harnessed for new applications in security, bio photonics and photo medicine. Professor Samuel confirmed that floating a thin plastic film off a substrate, has made some of the world's smallest and lightest lasers and put them on contact lenses and bank notes.

3 Turning Graphene into light Nano sensors

Graphene does not absorb light very well. To remedy this limiting aspect; physicist resort to embedding a sheet of graphene in a flat photonic crystal, which is excellent for controlling the flow of light. The arrangement endows graphene with substantially enhanced light absorbing capabilities. Arezou Rashidi and Abdolrahman Namdar from the University of Tabriz demonstrated that by altering the temperature in such a hybrid cavity structure, they can tune its capacity for optical absorption. They also described that it is the thermal expansion and thermos-optical effects which give the graphene these optical characteristics. Major applications include light sensors, ultra-fast lasers and systems capable of modulating incoming optical beams.

4 Quantum Shift through Light

Scientist at Rice University used a unique combination of techniques to observe a condensed matter phenomenon about which others have only speculated. This research could aid in development of quantum computers.

Researchers, led by physicist Junichiro Kono and Xinwei Li, observed and measured what's known as Bloch-Siegert shift in strongly coupled light and matter. Results of complicated combination of modeling and experimentation could lead to greater understanding of theoretical predictions in quantum phase transitions because the parameters used in experiments are highly

adjustable. That may help in the development of robust quantum bits for advanced computing.

In conclusion, Electronic Research and Application Journal (ISSN: 2208-3510) will continue its development to focus with the international research as open access to achieve clearest possible scientific picture on the coming up prospect for a betterment of future.

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