Novel Light-Matter Interaction in Semiconductors

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BRIEF DESCRIPTION

A fundamental scientific breakthrough is poised to fundamentally reshape the nature of light-matter interactions, particularly in silicon, resulting in dramatic enhancement of optical absorption and emission and potentially revolutionizing its applications in various fields.

APPLICATIONS

- Optoelectronics
- Photovoltaics and solar energy conversion
- Light-emitting devices
- Optical sensing
- Transistors

ADVANTAGES

- 102-103 increase in optical absorption for silicon
- Absorption efficiency increase across whole solar spectrum, slightly exceeding silicon bandgap
- Clear potential for thin film (sub-μm) silicon solar cells
- Opens new radiative transition channels to use for true broadband white-light LED

DESCRIPTION

Researchers have discovered that light can be easily conditioned to attain new property – large photon momentum. This novel property radically transforms the nature of interactions between light and matter, as it opens new pathways for directly fulfilling both the energy and momentum conservation laws during the interaction. For example, this new light-matter interactions transforms bulk Si from an indirect to a direct band gap semiconductor, marking the dawn of a new paradigm that reshapes the intrinsic optical properties of indirect bandgap materials. The many-fold enhancement of the semiconductor's optical properties is expected to have a colossal impact on many areas of optoelectronics, including photovoltaics and thin-film solar cells, transistors nanofabrication and light-emitting devices.

PATENT STATUS

Patent Pending

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Semiconductors**
» Design and Fabrication
» Materials
» Other

RELATED CASES

2023-770-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Method For Liquid-To-Solid Phase Separation Of Uranium And Uranyl Contaminant From Various Solutions
- Method For Rapid In Situ Detection Of Ammonia

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