Institut "Jožef Stefan", Ljubljana, Slovenija

center za prenos tehnologij in inovacij
na Institutu "Jožef Stefan"

Licensing opportunity

Small-sized electro-absorption modulator enabling improved optical communications inside electronic devices

Field of use
optical data storage, optical processing, telecommunications, integrated optics

Current state of technology
TRL 3 – 4: experimental proof of concept, validated in laboratory

Patent status
Patent(s) filed, but not yet granted

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EOM

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Background

A Slovenian – Swiss – Italian R&D organization consortium has developed an electro-absorption modulator (EAM) for use in telecommunications and optical/photonic integrated circuits. Due to its smaller size the device allows for improved signal transmission and is cheaper to produce compared to known EAMs. Industrial partners interested in license agreements, technical cooperation agreements, and/or research cooperation agreements, are sought.

Description of the Invention

Electro-absorption modulators (EAMs) are candidates for use in external modulation links in telecommunications and internal links on integrated circuits of photonic and electronic devices.

Compared to existing modulation systems, EAMs operate at 10-times lower voltages, generate less heat, and enable faster signal transmission.

Slovenian, Swiss and Italian researchers have developed an EAM based on a semiconductor material with exceptionally strong light-matter interaction. The device consists of an ultrathin (few nm) semiconductor film that is sandwiched between two transparent electrodes and whose transmission is modulated by the applied voltage between the two electrodes.

The device may be inserted directly into the light path (preferentially with the semiconductor film perpendicular to the light path) or cladding a waveguide (as in current electroabsorption modulator technology) to modulate the evanescent wave.

Various embodiments and geometries were developed that achieve a significant light modulation on an unprecedentedly short optical path.

EAMs presented here are due to their small size more applicable in future electronic devices (e.g. desktops, mobile phones, modems, routers etc.) in which conventional electronic integrated circuits will be replaced by photonic circuits capable of faster, more energy efficient data transmission.

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Since the technology aims to reach its full potential in an industrial setting wherever precise EAMs are needed, industrial partners are sought. The technology is in the field of finer mechanics, therefore technical cooperation is sought in order to facilitate continuous development rather than just routine production, and to validate the technology in an industrial setting.

License agreements and / or agreements for research / technical cooperation will enable the researchers to maintain their focus on the research behind the technology whereas validation will be carried out in the industrial partner's setting. The possibility of joint applications to EU calls are not excluded.

Main Advantages

In addition to known advantages of EAMs (lower energy consumption, lower heat generation and faster signal transmission) the device presented here:

- achieves a significant light modulation on an unprecedentedly short optical path;
- The size of device is significantly reduced;
- And the semiconductor material consumed for its production is consequently also significantly reduced.

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