Title
Review Paper: Integrated Structured Light Arhitectures

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Publication Date
2022-12-08

ECE 170A
Sergio Carbajo
December 7, 2022

Review Paper: Integrated Structured Light Architectures

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ABSTRACT:

Light structure is so unique and versatile. It supports how the geometry and arrangement of light can determine the display and reaction of matter. The introduction of laser architecture leads to light generation through design.

INTRODUCTION:

When looking at the applications of structured photonics, the potential results can be great, however, we are still at the stage where we have boundaries when it comes to light generation. Structured light can be engineered using spatial light modulators (2). A spatial light modulator (SLM) is an object that executes a form of spatially changing modulation on a light beam. In addition, the intensity and phase of the light beam in an image gets handled by the SLM (2). The Faraday Effect can be used for magneto-optic spatial light modulation (1). The Faraday Effect is where the polarization change due to the linear magneto-optic effect on an optical wave propagates through a magneto-optic effect (1). Structured light has issues when it comes to operational damage threshold since little to no progress occurs when moderate to extremely high-power levels are at use (2). The use of femtosecond pulses and phased arrays have helped with the demonstration of synthesis of light beams. Amplitude modulation, active polarization, and carrier-envelope phase (CEP) modulation help produce larger bundles of synthesized beams (2).

METHODS:

One of the methods discussed in the paper that I would like to elaborate further is **Multi-channel phase modulation: FPGA-based LOCSET**. There are seven channels with an aligned and incoming optical phase that help start optical phase control and modulation (2). This is done through overlapping these channels on a photodiode. Junction photodiodes are commonly known as the most used photodetectors in the photonics industry (3). The type of photodiode used was an avalanche photodiode. I thought that was interesting since it looks like a PIN photodiode. I found that the electron hole pairs, generated by incident light, in an avalanche photodiode produces more carries due to the electric field (3). The gain of the diode is increased which leads to bigger levels of sensitivity (3). Avalanche photodiodes are extremely fast just like PIN photodiodes. In photodetectors with an internal gain like an avalanche photodiode, signal, and noise and both amplified.

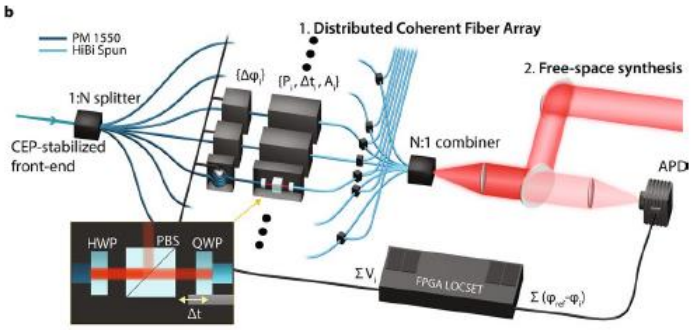

Fig. 1b. Experimental configuration via coherent multi-channel coherent fiber array with a common CEP-stabilized front end which also includes independent phase, amplitude, polarization state, timing controls, active locking. All of this through FPGA LOCSET that uses an avalanche photodiode (2)

RESULTS AND INTERPRETATION:

Using the LOCSET technique helps fix the power size issue discussed earlier because active control and phase-locking can be assisted in many channels (2). In addition, the complex optical modulation program can be programmed when the optical coherence is recognized at the photodiode (2). Optical coherence refers to light's inference effects .

CONCLUSION:

Photonics focuses on the control and use of light for applications. Through photonics, we find how interesting light structure is, whether we look at light's geometry and/or arrangement. Through methods such as carrier-envelope phase-stabilized front-end and beamline controls, multi-channel phase modulation with the use of FPGA-based LOCSET, beam propagation model, etc. we find how fascinating it is introducing laser architecture which opens the way to light generation.

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