Title
Review of Integrated Structured Ligh Architectures

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Review of Integrated Structured Light Architectures

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Abstract: In this review paper we examine a proposed architecture with the purpose of exploiting the properties of light to produce fully programmable light bullets. We then look at the presented results and consider the broader reaching impact of this research.

INTRODUCTION

The ability to engineer structured light has implications for physics, biology, engineering and a multitude of other fields. In this paper is a proposed set up to produce a larger family of synthesized beams allowing for control of multiple degrees of freedom within an optical beam[1]. More specifically this paper presents an architecture capable of controlling polarization, phase, amplitude, CEP, and pulse front[1].

METHODS

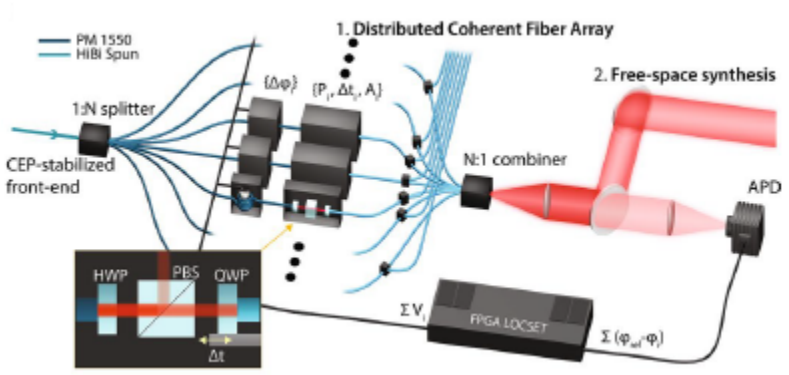

Figure 1. Proposed programmable architecture to control multiple degrees of freedom within light bullets[1]

In the proposed architecture there is a single beamline for which the remaining beamlines are referenced. All but this reference beamline are subjected to control of their amplitude, phase, polarization, and timing[1].

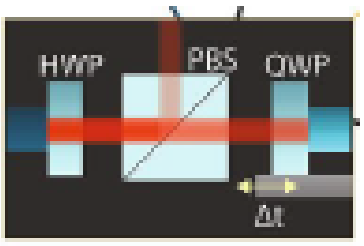

Figure 2. Intensity and Polarization Vector Control Unit[1]

The intensity and polarization vector control unit within the architecture consists of a half wave plate, polarizing beam splitter, and a quarter wave plate. The half wave plate and quarter wave plate are responsible for managing polarization through phase shift. The half wave plate is capable of rotating the polarization of a linearly polarized wave[2]. The quarter wave plate is able to convert from linear to circular/elliptical polarization[2].

Once light has passed through the complete architecture; the result is the ability to fully control multiple degrees of freedom within the light bullets.

RESULTS AND INTERPRETATION

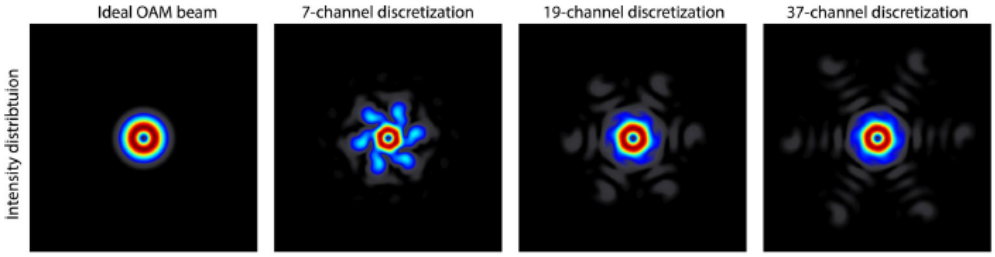

Figure 3. Beam intensity profiles[1]

As shown in the paper it is possible to control a multitude of degrees of freedom within the light bullets using the proposed architecture. A notable result is the amount of control over phase, amplitude, and polarization that was achieved.

When examining the results presented in the paper it is clear to see the relevance and broader implications of the work. The flexibility and control over multiple degrees of freedom within the light bullets can certainly have a large impact in telecommunications specifically. The ability to encode data within the controllable properties of the light bullets opens up the possibilities for increased speed and efficiency within telecommunication networks that can have reaching afters not only in the scientific communities but also in the private sectors.

CONCLUSIONS

In conclusion the researchers have shown they have developed an architecture that is capable of producing fully programmable light bullets with reaching implications within physics, biology, engineering, and many other scientific fields. Multiple degrees of freedom lead to the possibility of encoding data and increasing bandwidth in telecommunications systems.

REFERENCES

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2. Liu, J. (2016). *Principles of Photonics* 1st ed. pp. 80-81, Cambridge University Press