

Non-Mechanical Multi-Wavelength Integrated Photonic Beam Steering Device

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BACKGROUND

Today, projecting optical energy is performed using high power laser sources coupled to free-space optical systems comprised of mechanical components, moving parts, and bulk optics. Unfortunately, the application range of these legacy systems is limited by their size, weight, reliability and cost. Consequently, a substantial research effort has been directed toward the miniaturization and simplification of these systems. Recent work has focused on beam steering using phased arrays. Although optical phased arrays are an elegant non-mechanical beam steering approach, the technical and environmental challenges compared to RF systems (10,000 times smaller wavelengths and tolerances) are daunting. Multi-octave operation across the UV to LWIR regions with acceptable losses poses additional technical challenge for any optical phased array beam steering approach. For these reasons, a need exists for a non-mechanical beam steering approach that lends itself to miniaturization as well as high power ultra-wideband operation.

TECHNOLOGY DESCRIPTION

Researcher at UC San Diego have proposed a new design to overcome some of the performance issues outlined above, whereby the operation at multiple wavelengths is possible through the use of broadband emitters. Likewise, simultaneous multi-beam, multi-spectral operation can be realized with this highly flexible approach. Compared to more conventional approaches this design has reduced size and weight, relaxed coherence requirements, improved robustness and reliability, and superior operating efficiency. The result is an integrated, scalable, compact, non-mechanical broadband beam steering system.

APPLICATIONS

Numerous applications exist, including optical beamsteering for medical applications (laser surgery, scanning microscopy), manufacturing applications (laser cutting), telecommunications, remote sensing and rangefinding.

ADVANTAGES

Unlike conventional phased array designs, there are no coherence requirements on the sources within the proposed approach since only a single emitter is active at any time.

STATE OF DEVELOPMENT

The invention is at the conceptual stage.

INTELLECTUAL PROPERTY INFO

A provisional patent has been submitted and the technology is available to license.

PATENT STATUS

Patent Pending

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OTHER INFORMATION

KEYWORDS

Beam Steering, Integrated Optics,
Multi-Wavelength, Non-Mechanical,
Photonics

CATEGORIZED AS

- **Communications**
 - Optical
- **Engineering**
 - Engineering
- **Materials & Chemicals**
 - Other

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