

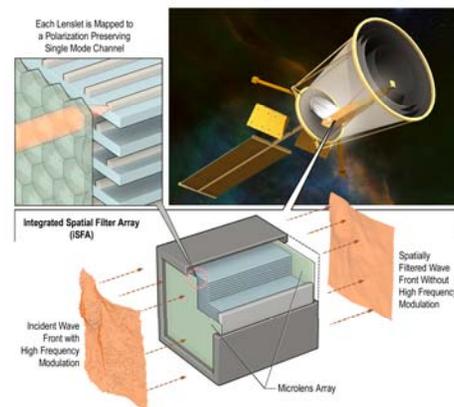
Integrated Spatial Filter Array (iSFA)

PI: Jun Ai/Luminit, LLC – Torrance, CA

Proposal No: S1.04-8859

Identification and Significance of Innovation

Luminit proposes to develop a novel polarization-preserving Integrated Spatial Filter Array (iSFA) comprising 36×36 waveguides and two microlens arrays in a hexagonal configuration that will enable amplitude and wavefront control in TPF-C imaging of distant planets as we search for livable abodes beyond our solar system. Each waveguide acts as a polarization maintaining single-mode fiber and is precisely mapped to a pair of input/output lenslets. The 36×36 waveguides have identical fast and slow polarization axes and can be mass-fabricated to reduce cost and enhance placement accuracy, uniformity, throughput and reliability. The reliable, robust, and lightweight iSFA will be hermetically packaged in a 1 cubic inch box to withstand high radiation and temperature extremes in space.



Technical Objectives:

1. Design and simulation of the proposed iSFA. Determine optimal iSFA parameters for amplitude and wavefront control for TPF-C.
1. Fabrication and packaging of iSFA. Development of fabrication processes and packaging for iSFA.
2. Testing and evaluation of iSFA, to meet NASA's requirements. At the end of Phase I, Luminit will deliver design parameters, simulation results, fabrication SOW and test documents for Phase II.
3. Commercialization: Preliminary establishment of the proposed iSFA for free-space optic communications, remote sensing, and environmental monitoring.

Work Plan:

1. Design iSFA for use in TPF-C
2. Determine optimal iSFA Parameters
3. Determine fabrication processes
4. Develop assembly and packaging
5. Develop test methods and evaluate iSFA
6. Explore commercial potential.

NASA Applications:

NASA applications include amplitude and wavefront control as part of the Terrestrial Planet Finder for the detection of planets beyond our solar system and the Stellar Imager for the study of new stars.

Non-NASA Applications:

Free-space optical communications, laser satellite communications, remote sensing, environmental monitoring, and LADAR imager sensors.

Firm Contacts

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