

HELIOS: Heterogeneous Laser Transmitter Integration for Low SWaP

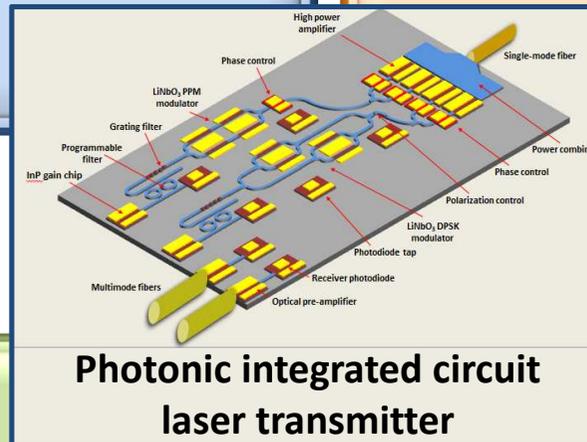
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JPL
Jet Propulsion Laboratory
California Institute of Technology

MIT
Lincoln
Laboratory



Research Objectives

- Apply heterogeneous photonic integration to deep space laser transmitter technology
- System-on-chip integration for low SWaP, increased reliability, and higher performance
- TRL 1-2 at start: Technology study, conceptualization, feasibility, benefits
- TRL 2-3 at end: Proof-of-concept development, design, prototype fabrication and characterization

Approach

- Collaborations with leading space flight transmitter experts at MIT/LL and JPL to evaluate potential impact and define specs.
- Heterogeneous integration approach for best-of-class component performance
- Photonic integration library of building blocks for ease of design
- Industrial foundries for rapid prototyping and to create path for increasing TRL

Potential Impact

- Unprecedented SWaP and cost reduction
- Added functionality, flexibility and re-configurability
- Module convergence by electron-photonic integration and optical interconnects
- Introduces new paradigm for space laser communication hardware design with potential to enable new missions