Integrated tapered active modulators for high efficiency Gbps PPM laser transmitter PICs

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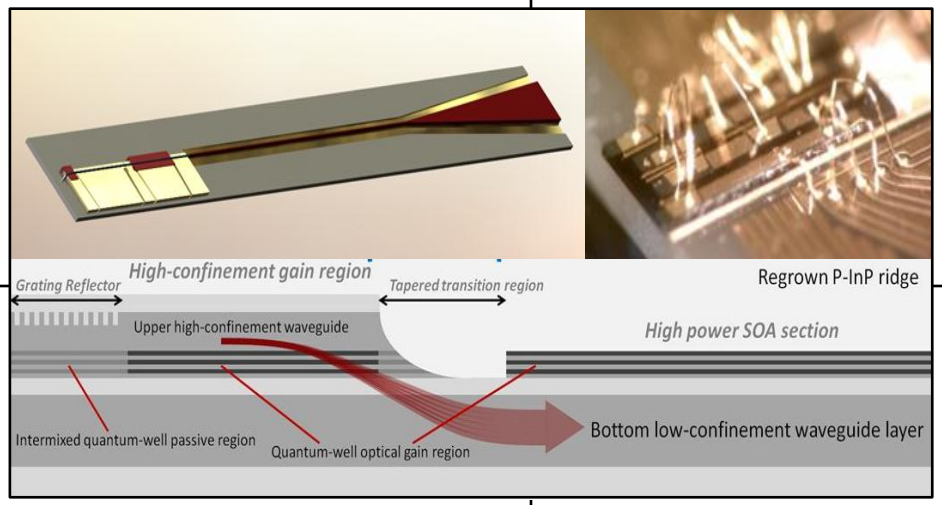
Research Objectives

- Demonstrate novel photonic integration platform designed specifically for the needs of satellite-based free space communication systems
- > 1W output power and >100 Gbps PPM data rate
- Maintain compatibility with existing PIC technologies



Approach

- InGaAsP epitaxy with low voltage defect and low optical loss for >40% conversion efficiency power amplification
- Tapered active amplifier for >1W output
- Tapered coupling from high-confinement single-frequency source to low-confinement amplifier section.

Potential Impact

- 100x faster data rates
- 100x smaller footprint
- 10x higher power and reliability (radiation-hard) laser transmitters
- Cost-effective solution for improving SWaP of satellite communication systems
- Enabling FSO for inter-satellite, satellite-to-ground, air-to-ground, air-to-air, air-to-space, and ground-to-ground applications