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**Available Technologies** 

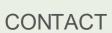
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### Degenerate Distributed Feedback (DDFB) Laser

Tech ID: 33967 / UC Case 2023-789-0



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# OTHER INFORMATION

#### **CATEGORIZED AS**

- » Communications
  - » Internet
  - » Networking
  - » Optical
- » Security and Defense
  - >> Other
- » Sensors & Instrumentation
  - » Other

RELATED CASES

2023-789-0

#### **BRIEF DESCRIPTION**

The DDFB laser introduces a novel feedback mechanism for enhanced frequency selectivity and stability in laser oscillation.

#### **FULL DESCRIPTION**

The DDFB laser is a revolutionary advancement in laser technology, utilizing a dual grating structure to support four degenerate modes, offering stronger feedback and improved frequency selectivity compared to traditional DFB lasers. This innovative approach allows for single-mode lasing and higher efficiency, overcoming the limitations of conventional DFB lasers.

#### SUGGESTED USES

- » Optical fiber telecommunications
- >> Wide band optical communications
- >> Coherent communications systems
- >> LIDAR technology
- » RF photonics
- >> Precision metrology
- » Quantum technologies
- >> Spectroscopy and sensing application

#### **ADVANTAGES**

- >> Enhanced frequency selectivity and stability
- Single-mode lasing with higher efficiency
- >> Improved resistance to changes in intensity and phase due to spontaneous photon injection
- » More stable operation with respect to cavity terminations and environmental variations
- >> Eliminates the need for defects within the cavity for stability, unlike DFB lasers
- » Greater amplitude sensitivity to some modulation effects, facilitating easier optical light modulation
- >> Lower lasing threshold and narrower linewidth compared to conventional DFB lasers

#### PATENT STATUS

Patent Pending

#### **RELATED MATERIALS**

**>>** T. Mealy and F. Capolino, "Degenerate Distributed Feedback Photonic Structure With Two Gratings Exhibiting Degenerate Band Edge," in IEEE Photonics Technology Letters, vol. 35, no. 4, pp. 187-190, 15 Feb.15, 2023, doi: 10.1109/LPT.2022.3215661

