

Degenerate Distributed Feedback (DDFB) Laser

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CONTACT

Edward Hsieh
hsiehe5@uci.edu
tel: 949-824-8428.



OTHER
INFORMATION

CATEGORIZED AS

- » Communications
- » Internet
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- » Optical
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RELATED CASES

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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

