

Web of Science

Search | Search Results | My Tools | Search History | Marked List

Look Up Full Text | Save to EndNote online | Add to Marked List | 112 of 491

Stabilizing optical feedback-induced chaos by sinusoidal modulation beyond the relaxation frequency in semiconductor lasers

By: Bakry, AH (Bakry, A. H.); Ahmed, M (Ahmed, M.)^[1,2]
[View ResearcherID and ORCID](#)

JOURNAL OF EXPERIMENTAL AND THEORETICAL PHYSICS

Volume: 119 Issue: 4 Pages: 591-599

DOI: 10.1134/S106377611409009X

Published: OCT 2014

[View Journal Impact](#)

Abstract

We report on stabilizing the chaotic dynamics of semiconductor lasers under optical feedback (OFB) by means of sinusoidal modulation at frequencies far beyond the relaxation frequency of the laser. The laser is assumed to be coupled to a short external cavity, which is characterized by a resonance frequency spacing higher than the relaxation frequency. The study is based on a time delay rate equation model of OFB, which is suitable for treating the regime of strong OFB and considering multiple reflections in the external cavity. We show that the intensity modulation response of the chaotic laser under strong OFB is enhanced over a narrow frequency band near the doubled relaxation frequency due to a photon-photon resonance. Within this high-frequency band, the sinusoidal modulation may convert the chaotic attractor to a limit cycle, and the small-signal modulation suppresses the relative intensity noise (RIN) to a level only 2 dB higher than the RIN level of the solitary laser.

Keywords

KeyWords Plus: RELATIVE INTENSITY NOISE; MODE COMPETITION; EXTERNAL-CAVITY; DIODES; SUPERPOSITION; FLUCTUATIONS; REDUCTION; BANDWIDTH; INJECTION; SYSTEMS

Author Information

Addresses:

- [1] King Abdulaziz Univ, Fac Sci, Dept Phys, Jeddah 21589, Saudi Arabia
- [2] Mania Univ, Fac Sci, Dept Phys, Al Minya, Egypt

E-mail Addresses: mostafa.hafez@science.miniauniv.edu.eg

Funding

Funding Agency	Grant Number
Deanship of Scientific Research (DSR), King Abdulaziz University, Jeddah	130-057-D1434
DSR	

[View funding text](#)

Publisher

MAIK NAUKA/INTERPERIODICA/SPRINGER, 233 SPRING ST, NEW YORK, NY 10013-1578 USA

Categories / Classification

Research Areas: Physics

Web of Science Categories: Physics, Multidisciplinary

Document Information

Document Type: Article

Language: English

Citation Network

1 Times Cited
 34 Cited References
[View Related Records](#)

[Create Citation Alert](#)

(data from Web of Science Core Collection)

All Times Cited Counts

- 1 in All Databases
- 1 in Web of Science Core Collection
- 0 in BIOSIS Citation Index
- 0 in Chinese Science Citation Database
- 0 in Data Citation Index
- 0 in Russian Science Citation Index
- 0 in SciELO Citation Index

Usage Count

Last 180 Days: 0
 Since 2013: 6
[Learn more](#)

Most Recent Citation

Ahmed, Moustafa. [Modeling of noise and distortion associated with ultra-high-speed modulation of VCSEL with slow-light feedback](#). INTERNATIONAL JOURNAL OF NUMERICAL MODELLING-ELECTRONIC NETWORKS DEVICES AND FIELDS, MAY-JUN 2016.

[View All](#)

This record is from:
Web of Science Core Collection
 - Science Citation Index Expanded

Suggest a correction

If you would like to improve the quality of the data in this record, please [suggest a correction](#).

Accession Number: WOS:000345392500001

ISSN: 1063-7761

eISSN: 1090-6509

Journal Information

Table of Contents: [Current Contents Connect](#)

Impact Factor: [Journal Citation Reports](#)

Other Information

IDS Number: AU1PL

Cited References in Web of Science Core Collection: **34**

Times Cited in Web of Science Core Collection: **1**

