

## **Multi sections semiconductor lasers with an air gap for chaos based communication**

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This paper reports the numerical results of the dynamical behavior of a novel integrated semiconductor laser subject to multiple optical feedback loops. The laser's setup consists of distributed feedback active section coupled to multi section cavities. It is found that due to the multiple feedback loops and under certain operating conditions, the laser displays chaotic behaviors appropriate for chaos-based communications. The optimal conditions and suitable parameters for chaos generation are identified. The synchronization of two unidirectional-coupled (master–slave) systems is studied. Finally, example of 5 GB/s message encoding and decoding are presented and discussed.

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