

Injection-Locked Tunable Photonic Oscillators: Going Quantum Again!

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The dynamics of the injection-locking architecture enabled with semiconductor lasers, like quantum well, quantum dot and quantum cascade on photonic integrated circuits or on a tabletop configurations with discrete devices have been investigated analytically, numerically, and experimentally for the past 50 years. Today, this deceptively simple-looking photonic system, that involves only one follower and one driver diode laser, keeps delivering surprising physics results and spinning out radical engineering applications. In this lecture we review the legacy results of its intricate behavior and articulate a set of forward-looking applications, spanning from tunable oscillators and ultrafast transmitters to dynamically empowered metamaterials and photonic quantum elements for communications, computing and sensing.

References

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