

Antiresonances, Ultrafast Resonances and Exceptional Points in Twin Photonic Oscillators

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1 Abstract

In this talk we will cover the properties of the small-signal modulation response of symmetry-breaking phase-locked states of twin coupled semiconductor lasers[3]. The extended stability and the varying asymmetry of these modes allows for the introduction of a rich set of interesting modulation response features, such as sharp resonances and antiresonances[1] as well as efficient modulation at very high frequencies exceeding the free running relaxation frequencies by orders of magnitude. And show the abundance of exceptional points in the generic asymmetric configuration of two coupled[4, 5] diode lasers, under nonzero optical detuning and differential pumping. We pinpoint the location of these points with respect to the stability domains and the Hopf bifurcation points of phase-locked modes, in the solution space as well as in the space of experimentally controlled parameters[2]. Time permitting we will discuss also some new experimental and theoretical findings on Quantum Dot Lasers as enablers of tunable photonic oscillators and clocks[6].

References

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