Abstract:

An optically injected semiconductor laser can exhibit a rich variety of nonlinear dynamics. Of particular interest is the ability to exploit the stable periodic dynamics for the synthesis of microwave signals. In this talk, I will discuss the mechanisms which contribute to the phase noise (or linewidth) of the optically generated microwave signal -- still an open question -- and how we improve the phase noise by including opto-electronic feedback. Furthermore, I will discuss our theoretical and experimental results which highlight the fundamental limits of the speed at which the frequency of the microwave signal can be tuned.