



23rd July 2018 - 01:15 p.m.

CFEL-bldg. 99, seminar room IV (O1.111)

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**Silicon photonics based optical
frequency synthesizer**

Phase coherent links from optical frequencies down to electronic radio frequencies have the potential for disruptive applications, for example, in coherent communications, frequency metrology and optical atomic clocks. Optical comb systems enable precision frequency synthesis in which a continuous wave (CW) laser oscillator can be phase stabilised and tuned over the wide bandwidth of a phase-locked frequency comb, thus synthesising precise optical frequencies on demand. Such systems need to leverage CMOS foundries for wide availability.

In this talk I will present our progress towards such a system using a silicon-on-insulator (SOI) platform. The pulse repetition rate (f_{rep}) and carrier offset frequency (f_{ceo}) of a mode-locked laser (MLL) are stabilised to a reference radio frequency source using supercontinuum (SC) and second harmonic generation (SHG) for 1f-2f referencing in SOI waveguides. Subsequently, a tunable low noise integrated CW laser is phase locked in the C-band to the desired stabilised comb frequency for optical frequency synthesis.