Nonlinear Si Photonics and Silicon EO Modulator
Based on Photonic Crystal and EO Polymer

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2D Photonic Crystal Resonator for Electrooptic (EO) Modulator

Based on the results from FDTD simulation, we’ve modified the design of our photonic crystal resonator so that its resonance will locate at around 1550 nm after the infiltration of EO polymer. Silicon oxide is removed from the BOX layer of the SOI wafer under the photonic crystal region, which makes the photonic crystal membrane encompassed by EO polymer after infiltration. Such a structure is as shown in Figure 1.

Group Velocity Tailoring for Si Waveguide and Kerr Switching

The tight mode confinement and high nonlinearity in SOI waveguides help realize lots of functionalities based on nonlinear effects, on chip. We designed SOI waveguides that show similar group velocity for both the pump and probe light to prevent optical pulse walk-off. Such waveguides are used to study the optical switching in an SOI waveguide through nonlinear polarization rotation induced by cross-phase-modulation (XPM) [1]. Waveguides were fabricated by stepper lithography (AS200) with the typical size of 800 nm by 400 nm on a SOI wafer. Optical measurements are still in progress at the time of submission.
References:

