

Second-order nonlinearities in strained silicon photonic structures

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Silicon photonics is being considered as the future photonic platform for low power consumption optical communications. However, silicon is a centrosymmetric crystal, i.e. silicon doesn't have Pockels effect. Nevertheless, breaking the crystal symmetry of silicon can be used to overcome this limitation. This crystal modification is achieved by depositing a SiN high-stress overlayer.

In this work, we present recent developments on the subject taking into account parasitic effects including plasma dispersion effect and fixed charge effect under an electric field. We theoretically and experimentally investigated Pockels effect in silicon waveguides and last results will be presented.