

Design and experimental characterization of terahertz Silicon-Organic hybrid (SOH) modulators

Silicon-organic hybrid (SOH) technology combines the exceptionally large electro-optic response of organic polymers with the strong field enhancement in silicon slot waveguides to build optical modulators which are highly efficient with ultra-low energy consumption of 25 fJ/bit. Although SOH modulators have been shown to operate at speeds up to 100 GHz, the 3-dB bandwidth of about 25 GHz is limited by the RC time constant of the device. The goal of this thesis is to examine various design aspects to extend the bandwidth of SOH modulators into terahertz regime. One attractive approach is to reduce the resistance by using a material with a high dielectric constant (high-k).

Starting: as soon as possible!

Your tasks

- Investigate the potential of high-k dielectrics
- Design and simulation of the new modulator concept
- Assist in the fabrication of the device
- Experimental demonstration of the bandwidth of the modulator

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