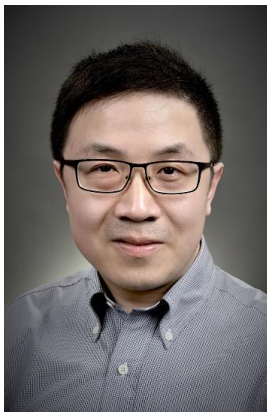
Center for Nanoscale Systems
Harvard University



CNS SEMINAR

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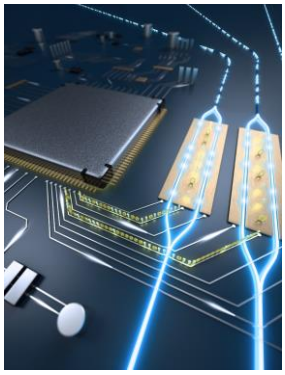
Dr. Mian Zhang

Prof. Loncar Group



Electro-optics on an Ultralow-loss Photonic Chip

Abstract: Integrated electro-optic devices are powering many areas of technology including telecommunication, sensing, signal processing and quantum information processing. Silicon, in particular, has made substantial progress in making these chips cost-effective and is finding wide applications in data centers. However, since silicon intrinsically lacks electro-optic effect, the cost of these electro-optic devices is reduced at the expense of degraded performances. The challenge of combining the excellent performance of bulk electro-optic devices and the scalability of integrated devices is in critical need for a wide range of classical and quantum photonic applications and is still an outstanding task.

We demonstrate a scalable and functional photonic platform that features large electro-optic efficiency, ultralow optical loss and compact footprint. The is enabled by nanofabrication of one of the best optical materials – lithium niobate, that has been an outstanding challenge for the industry over a few decades. Surprisingly we find that ultrahigh quality photonic devices can be fabricated at scale using only standard lithographic processes. Now it is possible to control light electrically at high speed without losing it and with performances beyond even the best bulk counter-part. We experimentally show that such capability has significant impact over a broad area of photonics including ultrafast modulators, coherent electro-optic converters and novel frequency comb generators and has the potential to reshape the future of integrated photonics.

About the speaker: Mian Zhang is currently a Postdoc fellow at Harvard SEAS. He is also a co-founder and CEO of HyperLight, a VC funded spin-out company from Harvard focusing on commercialization of lithium niobate integrated photonics technology. Mian obtained his PhD from Cornell University in 2015. Prior to that, he received his bachelor's degree from University of Bristol in UK.

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