



Nonlinear Photonics Based on Thin-Film Lithium Niobate

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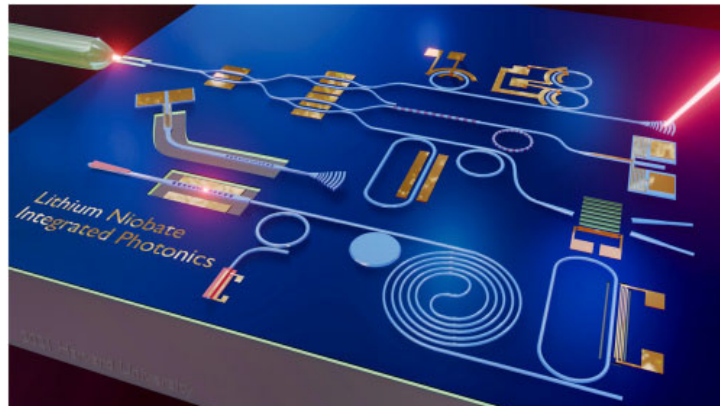
12:00pm – 1:00pm

Virtual: <https://purdue-edu.zoom.us/j/94820666697>



Abstract:

Lithium niobate (LN) is an excellent nonlinear photonic material due to its large electro-optic (EO) coefficient, second order ($\chi_{(2)}^{(2)}$) and Kerr ($\chi^{(3)}$) nonlinearity, along with a wide optical transparency window. Thanks to the recent advances in nanofabrication technology, monolithic LN waveguides with high optical confinement and ultralow linear loss has been achieved, which was critical to the success of the silicon-based platform in the past decade. Highly efficient and controllable light-matter interactions can be achieved using optical, electrical, or mechanical waves at extremely compact footprints. In this talk, I will review our recent developments of thin-film LN nonlinear devices for $\chi^{(2)}$ and $\chi^{(3)}$ -based parametric frequency conversion, high power EO frequency combs, femtosecond pulse synthesis and spectral-shaping of single photons. Combination of multiple nonlinearities of LN unlocks ultrabroadband electromagnetic spectrum from microwave to mid-infrared. Lastly, I will discuss the potential of LN photonic platform for scaling up and accelerating classical and quantum technologies in sensing, photonic computing, and communication networks.



Ref: D. Zhu et al. & Marko Lončar, "Integrated photonics on thin-film lithium niobate," *Adv. Opt. Photon.* 13, 242-352 (2021)

Bio:

Mengjie Yu is Gabilan Assistant Professor at the University of Southern California, Department of Electrical and Computer Engineering. She received her Ph.D. degree in Electrical and Computer Engineering in 2018 from Cornell University and held research staff associate position in Applied Physics and Mathematics at Columbia University from 2015-2018. She is a postdoctoral fellow in the John A. Paulson School of Engineering and Applied Sciences at Harvard University from 2018-2021.

She serves on the Early Career Editorial Advisory Board for APL Photonics. She is the 2020 the Optica (formerly OSA) Ambassador, the Caltech 2019 Young Investigator Lecturer and the Rising Star Women in Engineering in the Asian Deans Forum 2019. She served as chair of the OSA Integrated Photonics Technical Group from 2019 - 2021.