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Photonic meta-materials and Super-resolution Imaging

Joby Joseph
Indian Institute of Technology, Delhi 110016, e-mail: joby@iitd.ac.in

Recent advancements in phase-engineered interference lithography has made it possible to realize submicron-sized photonic structures over a large area with potential applications in the field of nano-photonics and super-resolution imaging. Chiral photonic helices as broadband circular polarizers can be formed through umbrella geometry involving a phase-only spatial light modulator and structures with sub-micron pitch as well as period can be obtained by incorporating an “inverted-umbrella” setup. Realization of such high resolution multi-beam interference patterns can also be effectively employed in optical microscope to extend the resolution beyond diffraction limit through structured illumination.

The talk will cover the basics of photonic meta-materials, meta-surfaces, photonic structures, super-resolution imaging etc. and recent advancements and results in these.