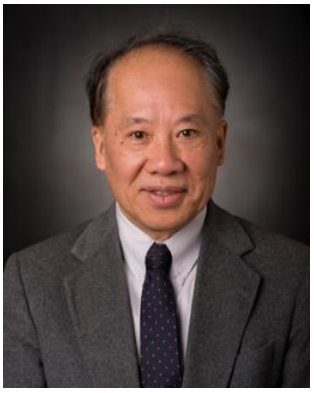
Institut d'Alembert Seminar / June 11th, 2024 at 11:15 am
Amphi Dorothy Hodgkin - 0I10 - Bât. Ouest



Soft chiral photonic crystals for ultrafast nonlinear optics

By Iam Choon Khoo,
Professor, PennState University.

Presentation :

Chiral photonic crystals (CPC) such as cholesteric liquid crystals [CLC] are actively being investigated for special advantages associated with highly tunable band gaps, band-edge dispersion and enhanced ultrafast optical nonlinearities. While interaction lengths on the order of microns may suffice for most conventional applications, some ultrafast nonlinear optical applications such as polarization rotation and switching of laser vector beams of complex polarization states, and self- or pump-pulse induced picosecond and femtoseconds pulse modulation[1] demand fabrication of these CPC to unconventional thicknesses in large areal size form. For operations in the near - to mid-IR [1000 nm – 5000nm or so], super thick CLC with index grating period number N (thickness/index grating period) >>1000 will be needed. This presentation will review recent advances[2] and our latest work in fields-assisted/directed assembly techniques that meet these challenges. The resulting super-thick CLC exhibit many capabilities impossible with other chiral photonic crystals - broad spectral window with near-unity transmission, large optical rotation power and ultrafast [sub-picoseconds] nonlinearity and dynamic tunability throughout the entire visible to mid- infrared regimes.

[1] Optics Express, 24, pp. 10458-10465 (2016); 26, 28818-28826 (2018)
[2] PNAS 118 (16) (2021); APR 10 (1), 2023

Biography :

Iam Choon Khoo, PhD, is currently the William E. Leonhard Professor of Electrical Engineering at Pennsylvania State University. He is the author/co-author of 294 journal publications, 7 books including two widely cited (~ 2990) books on liquid crystals optical physics and nonlinear optics, has given 428 presentations (32-Keynote/Plenary; 230-Invited), awarded 3 patents. He is the mentor of 33 Ph. D. graduates and has served as an external Ph. D. examiner for several oversea universities. He is a Fellow of: (Life Fellow) Institute of Electrical and Electronics Engineer, Optica, UK Institute of Physics and The Electromagnetic Academy. Among other honors and awards, he received the *2024 SPIE Maria Goeppert-Mayer Award in Photonics*.

10h45/11h – accueil café : "Kafé", rez-de-jardin de l'ENS Paris Saclay.