ΑΡΙΣΤΟΤΕΛΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΕΣΣΑΛΟΝΙΚΗΣ

ΤΜΗΜΑ ΦΥΣΙΚΗΣ

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ΣΕΜΙΝΑΡΙΟ

Plasmonics: from ultrafast nonlinear optics to surface plasmon vortices and to the revelation of optical skyrmions

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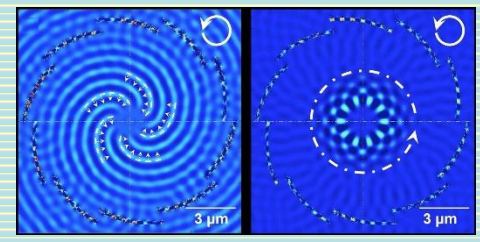
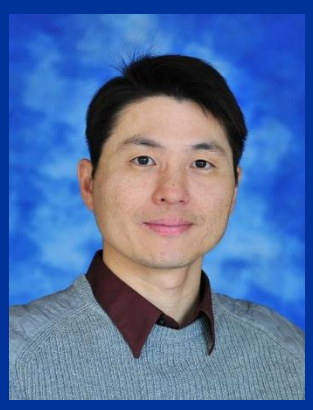
As documented in all nonlinear optics textbooks, second-harmonic generation (SHG) from a bulk material requires a non-centro-symmetric crystal structure. In the first part of the talk, I'll introduce a brand new way for SHG: combining symmetric and anti-symmetric propagating optical modes, not geometry, to permit emission of second-harmonic light from a fully symmetric nanocircuit formed by a centro-symmetric material.



Optical vortices are waves carrying orbital angular momentum and exhibit helical phase fronts. Generation of optical beams carrying orbital angular momentum has received increasing attentions recently, both in the far-field and in the near-field. In the second part of this talk, I will first introduce our recent progress on applying surface plasmon vortex for selectable particle trapping and rotation. The ability to spatially shape the near-field spatial patterns of surface plasmon vortices will be addressed. Next, I will focus on the creation of surface plasmon vortex using non-angular momentum excitation.

Skyrmions are stable quasiparticles in magnetic materials with distinct topological spin textures that have been investigated for several years by electron microscopy and scan tunneling microscopy techniques. In the last part, I'll address the first experimental evidence for an electric field spin angular momentum skyrmion at a plasmonic silver surface. We employ interferometric time-resolved photoemission electron microscopy to record a movie of the plasmonic fields with < 10 nm spatial resolution and < 100 as pump-probe pulse delay/frame.

Το προφίλ του ομιλητή



Chen-Bin Huang received his B.S. degree in electrical engineering from National Tsing Hua University, Taiwan, in 1997, his M.S. degree in electro-optical engineering from National Chiao Tung University, Taiwan, in 1999, and his Ph.D. degree from the School of Electrical and Computer Engineering at Purdue University, West Lafayette, IN, USA, in 2008.
He has worked at Bell Laboratories (Alcatel-Lucent) in the USA and the Opto-Electronics & Systems (OES) Laboratories of the Industrial Technology Research Institute (ITRI) in Taiwan. He joined National Tsing Hua University in Taiwan as assistant professor in 2008. He was promoted to associate professor in 2012, and to professor in 2016. He has worked as visiting scientist at University of Pittsburgh, Chinese Academy of Sciences, University of Bayreuth, University of Würzburg, and at Northwestern University. His current research interests include plasmonics, structured light, ultrafast optics, nonlinear optics, and millimeter-wave photonics.