ICFO COLLOQUIUM ALBERT POLMAN 'Optical Nanoscopy Using 30 keV Electrons'

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June 04, 2018

Monday, June 4, 12:00, ICFO Auditorium

ALBERT POLMAN

Center for Nanophotonics at AMOLF. Professor of Photonic materials for photovoltaics, University of Amsterdam, The Netherlands.$$Albert Polman is program leader of the "Light Management in New Photovoltaic Materials" program at the NWO Institute AMOLF in Amsterdam, the Netherlands, and Professor of Photonic Materials for Photovoltaics at the University of Amsterdam. Polman?s research group presently focuses on the study optical metasurfaces for analog optical computing, nanophotovoltaics, and the development of time-resolved quantum cathodoluminescence spectroscopy.
Polman is member of the Royal Netherlands Academy of Arts and Sciences (KNAW), recipient of ERC Advanced Investigator Grants (2011, 2016) and the ENI Renewable Energy Award, the

MRS Materials Innovation and Characterization Award, the Julius Springer Prize for Applied Physics, the NNV Physica Prize and the EPS Research into the Science of Light Prize. Polman is co-founder of Delmic BV that brings the cathodoluminescence microscope developed in his group on the market.

Cathodoluminescence imaging spectroscopy (CL) is a powerful tool to characterize optical nanomaterials at deep-subwavelength spatial resolution. In CL, a 5-30 keV electron beam is raster-scanned over the surface while the emitted radiation is detected. The electron beam creates a single-cycle electric field oscillation that couples strongly to the electrons in the material, providing a spectrally broadband nanoscale probe of the local optical density of states.

We use CL to coherently excite plasmonic nanostructures and directly image localized and polaritonic modes at 15 nm spatial resolution. We measure the bandstructure of 2D topological photonic lattices of Si Mie scatterers. We make high-resolution maps of the g(2) 2-photon correlation and show CL from InGaAs quantum wells is composed of photon bunches. We end with presenting the first data from our new femtosecond pulsed-laser driven time-resolved pump-probe CL microscope.

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