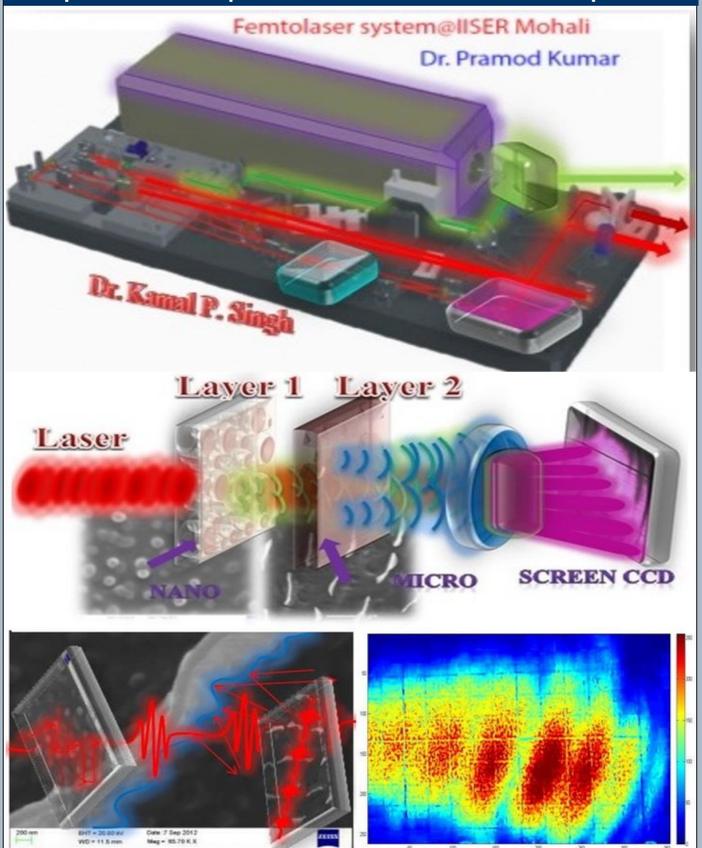


Introduction and Motivation

Light manipulation is crucial to enhance the light matter interaction in micro/ Nano photonic structures by generating desirable optical field components and increasing time and pathways of light propagation through the photonic structures. However, controlling the femtosecond laser pulses with nanometer accuracy is very challenging, as the limitation imposed by dispersion on the pulse duration and by the diffraction on the focusing of light must be overcome simultaneously. Thus, ultrashort laser pulses exhibit an interdependence of temporal and spatial coordinates, referred to as spatio-temporal coupling. Nature has developed a broad range of remarkable photonic architectures on the various insect wings surfaces to possess various optical properties for the multifunctional purpose. However, before such concept can be considered for real life implementation, fundamental optical properties or optical effects of these photonic systems need to be understood. Seeing inspiration from nature, we have naturally found deeply grooved blazed micro-grating arrays on transparent insect wing (Rain-fly) surfaces to manipulate and control light for tunable optical functionality. Our observation may open up new opportunities in biomimetic device research and also have potential for the design and development of diffractive optical components for photonic integrated systems.

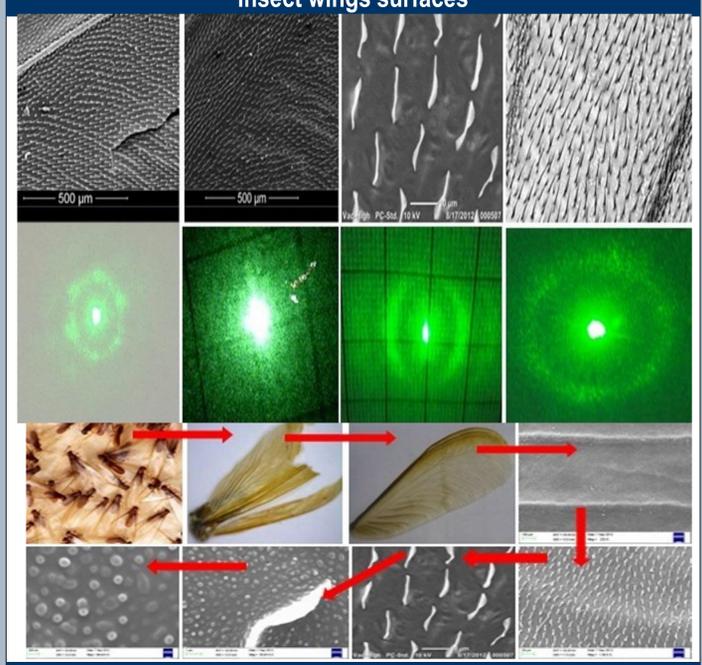
Experimental setup and Results – Blazed diffraction pattern



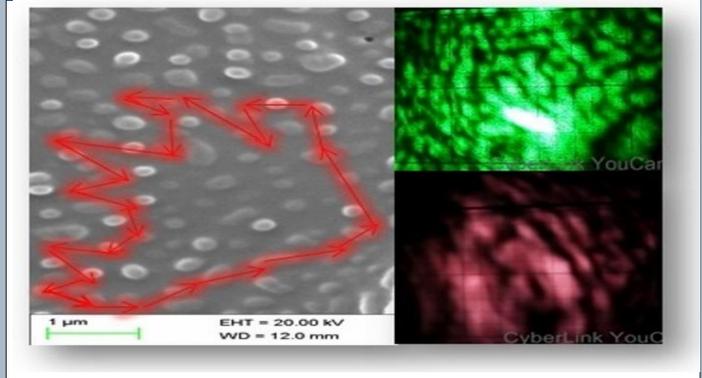
Femtolaser system@IISER Mohali
Dr. Pramod Kumar
Dr. Kamal P. Singh

Layer 1 Layer 2
Laser NANO MICRO SCREEN CCD

Optical classification of structural symmetries on various insect wings surfaces



Anderson localization: role of optical coherence and structural disorder

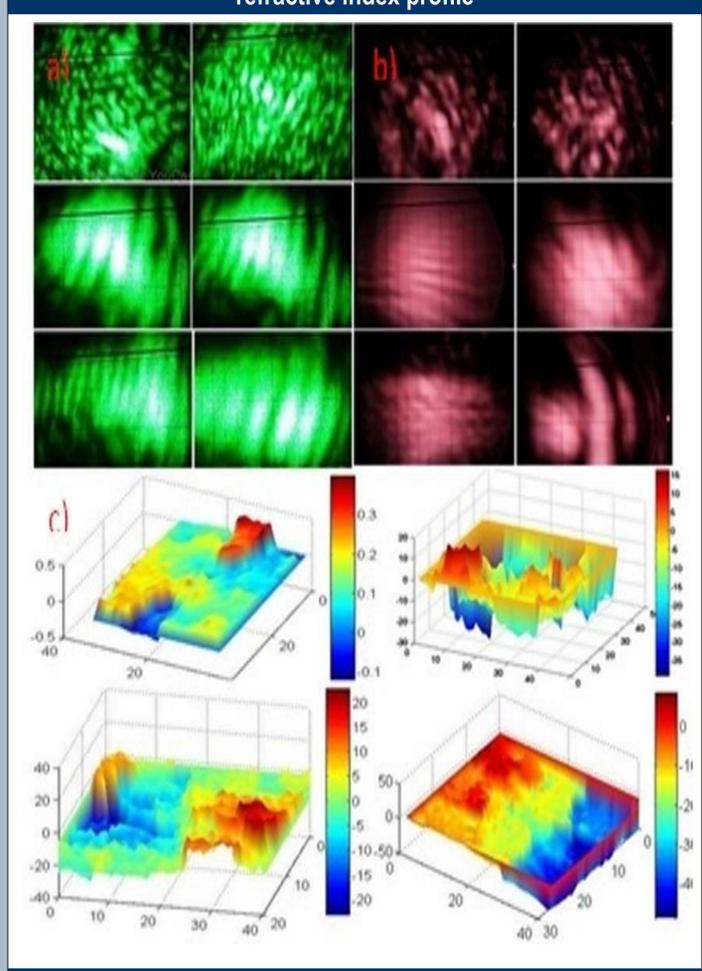


EHT = 20.00 kV
WD = 12.0 mm

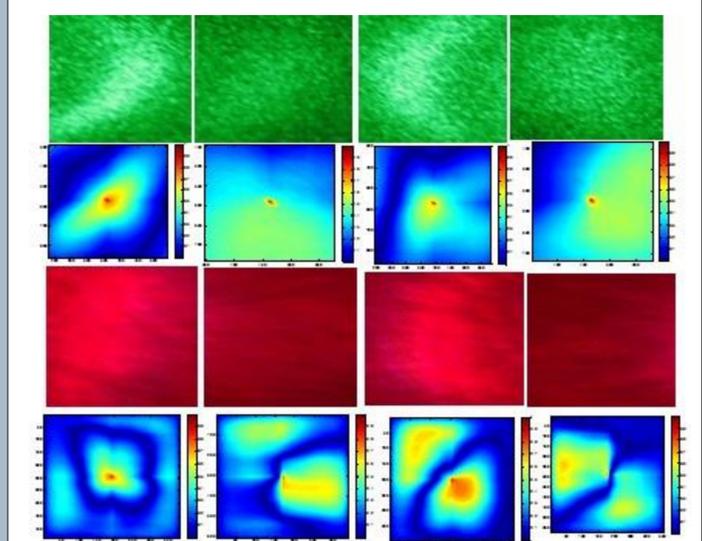
Signature of Far-field focusing effect: femtosecond laser pulses and CW Laser



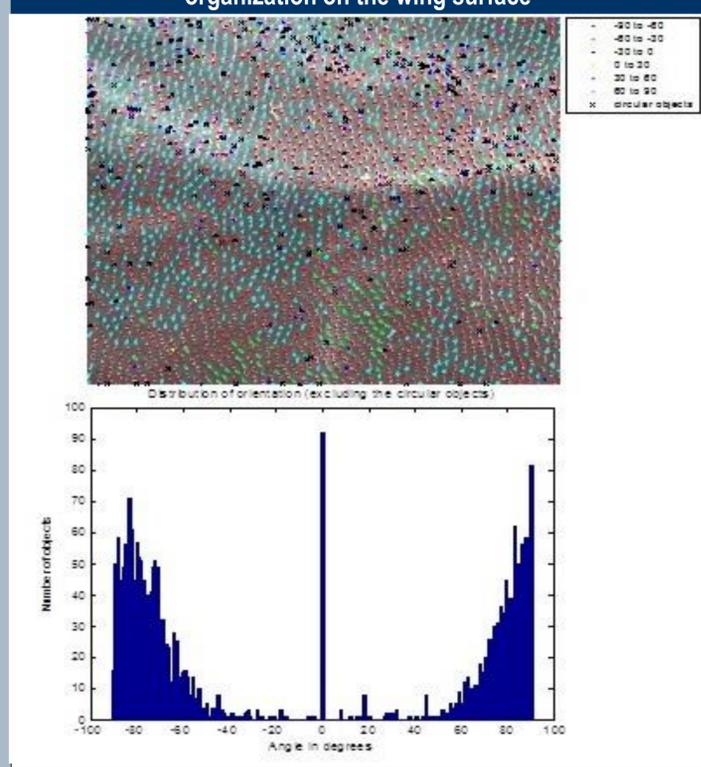
Optical diffraction from single Blazed micro-grating and refractive index profile



Autocorrelation of speckle pattern in various orders of diffraction : spatial coherence measurement



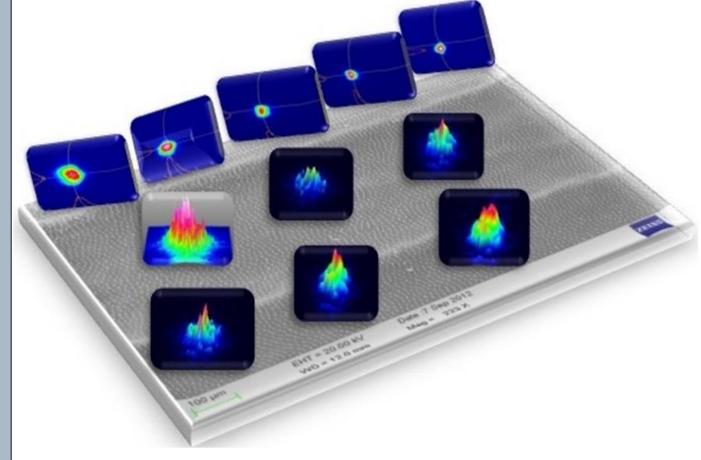
Distribution of angular arrangement in the microstructures organization on the wing surface



Distribution of orientation (excluding the circular objects)

Number of objects vs. Angle in degrees

Tunable spatial coherence



Contact information

PosterPresentations.com
a Canterbury Media Services, Inc. company

2117 Fourth Street
Studio C
Berkeley
California 94710

T: 510.649.3001
F: 510.649.0331
TF: 1.866.649.3004
E: production@cp-digital.com