PHOTONICS SCIENCE AND ENGINEERING (PSE)
CENTER FOR LASERS AND PHOTONICS (CELP), IIT KANPUR

CELP-PSE RESEARCH SCHOLAR DAY
8 APRIL 2023(Saturday): L-10, LHC, IIT KANPUR

THEMES
1. **Nanophotonics, structured surfaces and quantum optics**
2. **Fiber and integrated optics, optical communication**
3. **Biophotonics, imaging and spectroscopy**

SCHEDULE
1. 0930-0945: **Prologue: Introductory remarks and scheme of Research Scholar Day**
2. 0945-1045: **Dr. Kedar Bhalchandra Khare, IIT Delhi:** *Does holographic replay provide a true 3D image?*
3. 1045-1115: **Tea**
4. 1115-1300: **Student talk session 1; Themes 1 and 2**
5. 1430-1600: **Student talk session 2; Theme 3**
6. 1600-1630: **Tea**
7. 1630-1730: **Dr. K. Divakar Rao, BARC, Visakhapatnam :** *Noncontact 3D optical imaging for precision metrology and biological applications*
8. 1730-1735: **Closing remarks and vote of thanks**

STUDENT TALKS IN THEMES 1 AND 2

Dhananjoy De	Polarization sensitive mode coupling in optical nanocavities
Nitish Kumar Gupta	Direct determination of photonic bandgap character in topological photonic crystals
Deeksha S Jachpure	Non-linear optics with erbium-doped fiber
Aritra Paul	All-SBS fiber-based setup for optical frequency comb generation utilizing a pump recycling technique and comb line isolation by implementing Brillouin amplification
Garima Joshi	Structured surfaces for frequency filtering and antenna gain enhancement
Moirangthem Bikramjit Singh	Identifying the Quantum States of Light using Statistical Measurement

STUDENT TALKS IN THEME 3

Shivam Shukla	Testing and validation of a smartphone-based fluorescence spectroscopic device for cervical precancer detection
Subhajit Chakraborty	Quality measurements of alcohol-based hand sanitizers: A photothermal spectroscopic approach
Bhaswati Singha Deo	External attention based deep neural network model for reliable detection of oral cancer from histopathological images
Aman Sharma	Theoretical & numerical aspect of the time-resolved thermal lens using gaussian beam.
Devendra Singh	Chaotic cavity design of a UV-C disinfection chamber for uniform radiation distribution
Viren S Ram	Fringe pattern normalization using GANs

INVITED LECTURES

Does holographic replay provide a true 3D image?

Abstract:

We carefully examine the claim that holographic imaging provides a 3Dimage. While recording of a hologram involves transfer of information from a 3D volume to a 2D detector, the reconstruction involves starting with 2D data to get back 3D information. The dimensionality mismatch in the 3D reconstruction claim therefore appears to be troublesome since this supposedly extra information is obtained via simple linear back-propagation of the object field. We show that holographic replay is actually a transpose (rather than inverse) operation and the visual 3D reconstruction perception is actually due to the fact that our eye-brain combination has a tendency to concentrate only on sharply focused objects while ignoring diffuse background. The knowledge of the transpose property helps us to formulate a sparse reconstruction problem to generate a "true 3D" image reconstruction as we will illustrate with simulations and some initial experimental results.

Venue : L-10, LHC, IIT Kanpur
Date : 8 April 2023, Time : 0945 Hrs
Tea : 1045 Hrs

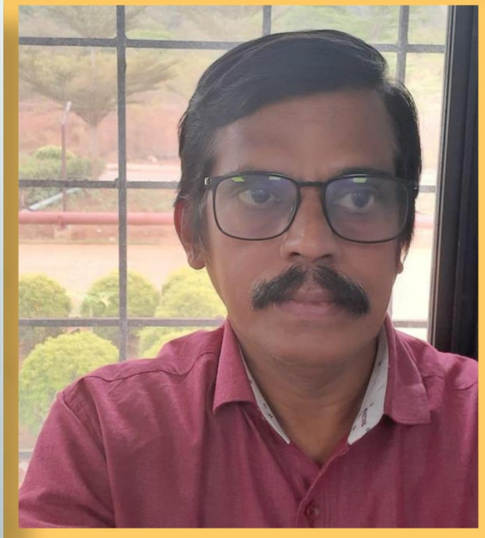
Dr. Kedar Bhalchandra Khare
Optics And Photonics Center
IIT DELHI

Noncontact three-dimensional optical imaging for precision metrology & bio applications

Abstract:

There has been continuous interest in developing optical techniques for real time 3d imaging. Optical coherence tomography (OCT) is a noncontact three dimensional imaging modality for real time imaging of highly turbid media like biological tissues with micrometer scale resolution. OCT has been successful as a rapid diagnostic tool in ophthalmology and several other nonmedical precision metrology applications are emerging. Digital holographic Microscopy (DHM) is another three dimensional optical imaging technique for label free quantitative phase imaging of microscopic objects & surfaces with nanometric precision. DHM is finding numerous applications in biomedicine, metrology etc. In this talk OCT& DHM will be discussed along with representative applications. Our recent work on developing low cost portable DHM system and aberration compensation in DHM by novel defocus hologram method will also be presented.

Venue : L-10, LHC, IIT Kanpur
Date : 8 April 2023, Time : 1630 Hrs
Tea : 1600 Hrs



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