



भारतीय प्रौद्योगिकी संस्थान कानपुर
Indian Institute of Technology Kanpur

PHOTONICS SCIENCE AND ENGINEERING

POST GRADUATE PROGRAM

Website: www.iitk.ac.in/celp



PHOTONICS SCIENCE AND ENGINEERING

Photonics Science and Engineering (PSE) under the aegis of Centre for Lasers & Photonics (CELP) at IIT Kanpur is an interdisciplinary programme, in which faculty experts from the departments of Chemistry, Electrical Engineering, Mechanical Engineering, Civil Engineering and Physics carry out cutting-edge research in Fiber-optic communications for 5G/6G, Photonics in Healthcare and Medicine, Optical imaging and instrumentation, Laser-based manufacturing, Quantum Optics and Quantum Communications, Nanophotonics, Ultrafast lasers and ultrafast phenomena, Laser spectroscopy among others.

The department offers academic programmes in PSE leading to degrees in Ph.D., M.Tech. and MS (Research and Sponsored). The courses offered by the programme lead students from introductory concepts in photonics and lasers to state of the art research in broad fields of Photonics. In addition to the usual classroom teaching, emphasis is given to hands-on experience on lasers. The students also make use of various facilities in CELP to carry out their thesis. After successful completion of the programme, our students are placed in leading industries and academic institutions across the world.



POST-GRADUATE PROGRAMMES OFFERED

- Doctor of Philosophy, PhD
- Masters of Technology, MTech
- Masters of Science (Research and Sponsored), MS

LABS/FACILITIES

- Ultrafast Laser spectroscopy
- Semiconductor optoelectronic device fabrication facility
- Femto-second laser and micromachining system
- Picoseconds- and nanosecond-lasers
- Micro-Raman facility
- Confocal microscopy
- Magnetron Sputtering system



FACULTY LIST

- ❖ **Debabrata Goswami**, Ph.D. (Princeton University, USA): Ultrafast Pulses, Non-linear Spectroscopy, Quantum Computing, Coherent Control
- ❖ **Pradeep Kumar. K** Ph.D. (IIT Madras): Quantum cryptography, Quantum optics, Non-linear Fiber optics, optical fiber communication.
- ❖ **B. Lohani**, Ph.D. (ESSC, UK): Laser ranging, Flash scanning Laser applications, Laser imaging and cross section
- ❖ **K. Muralidhar**, Ph.D. (Delaware, USA): Fluid Mechanics, Heat Transfer
- ❖ **Naren Naik**, Ph.D. (IISc Bangalore): Tomographic reconstruction and tracking algorithms; Fluorescence optical tomography; Biomedical and sub-surface multimodal tomographic imaging.
- ❖ **Pratik Sen**, Ph.D. (IACS, Kolkata): Femtosecond and picosecond ultrafast laser spectroscopy, nonlinear laser spectroscopy, protein stability, binary solvent mixtures.
- ❖ **Pradipta K Panigrahi**, Ph.D (Louisiana State University, USA): Optofluidics, Sensors and actuators, Electrohydrodynamics, Holography, Laser Schlieren, Particle image velocimetry.
- ❖ **G. Rajshekhar**, Ph.D (EPFL Switzerland): Optical Metrology, Digital Holography, Biomedical Imaging, Applied Signal Processing
- ❖ **R. Vijaya**, Ph.D. (IIT Madras): Fibre optics, non-linear optics, photonic band gap structures.
- ❖ **Harshawardhan Wanare**, Ph.D. (Hyderabad): Non-linear Optics, Quantum Optics, Light Interaction in Biological Tissues.
- ❖ **Shilpi Gupta**, Ph.D (University of Maryland College Park, USA): Photonics, Plasmonics, Quantum Optics
- ❖ **Sapam Ranjita Chanu**, PhD (IISc Bangalore): Quantum computation and simulations with cold ions, cold atoms and quantum metrology with single pure state of cold atoms and ions.
- ❖ **Mohammed Ibrahim Sugarno** (IISC Bangalore): High Speed flow visualization, Emission Spectroscopy



BROAD RESEARCH AREAS

- ❖ Fiber-optic communication
- ❖ Photonics in Healthcare and Medicine
- ❖ Optical imaging, tomography, and instrumentation
- ❖ Laser-based manufacturing
- ❖ Quantum Optics
- ❖ Nanophotonics and Optoelectronics
- ❖ Nonlinear optics
- ❖ Ultrafast lasers and ultrafast phenomena
- ❖ Laser spectroscopy
- ❖ Quantum Technology using atoms and ions





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