

# Seminar

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## Institute for Plasma Research

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**Title :** Preparation of functional materials using high power lasers for photonics and industrial applications

**Speaker:** Dr. Rudrashish Panda  
Institute for Plasma Research, Gandhinagar

**Date :** 24<sup>th</sup> July 2019 (Wednesday)

**Time :** 11.00 AM

**Venue :** Seminar Hall, IPR

### Abstract:

In recent years, implementation of water reclamation and reuse is gaining attention world-wide due to the water scarcity as a result of climate change and poor water resource management. Industries like textile, leather, plastic, pharmaceutical, paper etc. release various dyes as the waste products with water. At the moment, heterogeneous ultraviolet (UV) photocatalytic dye decomposition with semiconductor nanostructures is one of the best methods for the removal of these dyes. Therefore, extensive work is going on in the direction of the growth of various types of semiconductor nanostructures and their application for UV photocatalytic dye decomposition.

In this presentation, we describe a method to grow functional materials like ZnO and TiO<sub>2</sub> using pulsed laser deposition (PLD) on a sample with enhanced surface area after the laser induced periodic structuring (LIPS). These functional materials due to their enhanced surface area shall be ideal candidates for photocatalysis of waste water management. Preliminary experiments to optimize the laser beam parameters for the LIPS on different samples and ambient show the formation of periodic structures on the polished surface and have been verified using FESEM. A PLD set up is also made and the optimization process for the film coating is initiated.

In addition to photocatalysis related applications, the nanomaterials are known to have high nonlinear optical (NLO) properties. Hence, a second harmonic generation setup is made for NLO study of these samples. This technique can be used for effectively comparing the SHG behavior of any material in comparison to that of standard NLO materials using ns laser.

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