Seminar

Institute for Plasma Research

Title : Pulsed laser deposition of functional materials using high power lasers for photonics and industrial applications

Speaker: Dr. Rudrashish Panda
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Date : 29th July 2020 (Wednesday)

Time : 11.00 AM

Venue : Online - Join the talk:
https://meet.ipr.res.in/Dr.Rudrashish_PDFextensionTalk

Abstract:

In recent years, the trend in obtaining new material architectures with improved functionalities shifted towards nanoscale engineering, the advantages include minimized substance consumption, functionalization of the material surface and improvement of device performances. Pulsed laser deposition (PLD) offers good control to explore wide range of processing parameters such as laser wavelength, pulse repetition rate, laser energy per pulse, background gas pressure, substrate temperature, etc. and has been demonstrated to give phase pure metal oxides with good structural, morphological and electrical properties.

In this presentation, we describe the development and use of the PLD unit to grow composite and single phase functional materials like Cu_2O, CuO. The effect of ambient pressure and gas in synthesis of these direct band gap semiconductor thin films will be discussed. The samples are characterized using XRD, Raman spectroscopy and FESEM to explore the compositional and structural characteristics. Steps taken to increase the effective surface area shall be discussed. In addition to this, these materials are known to have high nonlinear optical (NLO) properties. Hence, one Z-scan setup is developed for third order optical nonlinearity study of these samples. This technique can be used effectively for comparing the third order nonlinearity of any material in comparison to that of standard NLO materials.