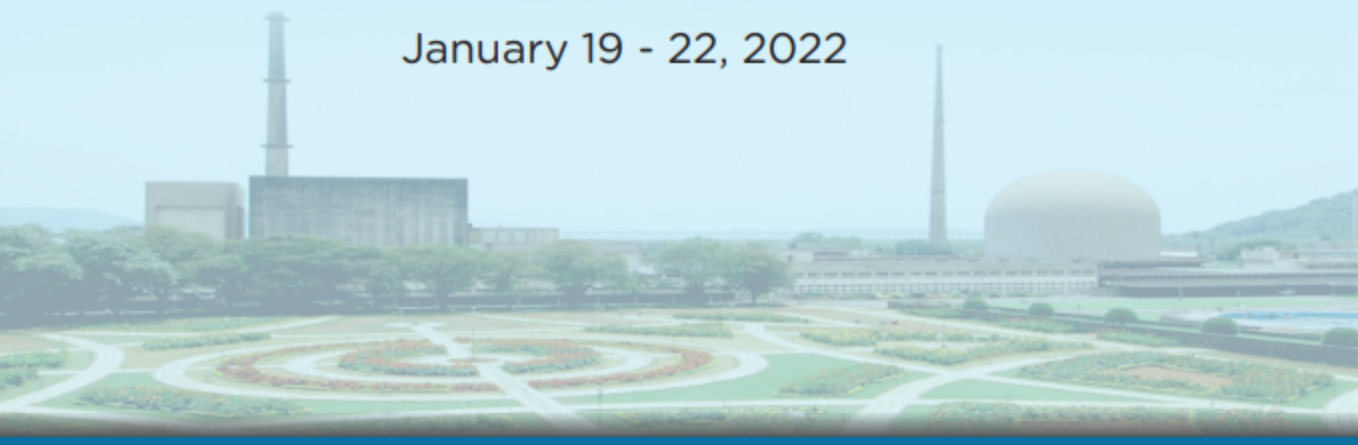




# DAE-BRNS National Laser Symposium (NLS-30)

BOOK OF ABSTRACTS

January 19 - 22, 2022



## CATEGORY 10: LASER IN LASER AND FIBER BASED INSTRUMENTATION

### CP-10-1. A REFLECTION TYPE MAGNETIC FIELD MEASUREMENT PROBE USING FARADAY EFFECT

Kanchi Sunil<sup>1,2</sup>, Rohit Shukla<sup>1,2</sup>, Premananda Dey<sup>2</sup>, A K Dubey<sup>2</sup>, K. Sagar<sup>2</sup> and Archana Sharma<sup>1,2</sup>,  
<sup>1</sup>Homi Bhabha National Institute, Mumbai-400094, <sup>2</sup>Pulsed Power & Electro-Magnetics Division,  
Bhabha Atomic Research Centre Facility, Visakhapatnam-531011., **E.mail** :  
[sunilkanchi8125@gmail.com](mailto:sunilkanchi8125@gmail.com)

Based on Faraday effect, reflection type magnetic field measurement probe is designed and its experimental results are reported in this paper. The Faraday effect produces the non-reciprocal circular birefringence i.e., when the light source traverses the magnetized medium through the sensor element twice, the Faraday rotations doubles. In the designed probe, Terbium Doped Borosilicate Glass (TDBG) is used as a sensor element. The light is reflected after traveling the TDBG glass length from the mirror and again traverses through the glass making the double transit through the sensor element. For measuring the Faraday rotations, fast photodetector assembly is used. The complexity in alignment of laser source, sensor element and detector is eliminated because all the components are part of the probe structure and the source and detector can be placed on same side. The designed probe is easily portable and can be used in various applications like Z/θ pinch devices, fusion reactors such as tokamaks, ITER, etc. for magnetic field measurements.

### CP-10-2. STUDY OF GAMMA RADIATION EFFECTS ON FBGS INSCRIBED IN DIFFERENT PHOTOSENSITIVE FIBERS

S. Chaubey, J. Kumar, R. Mahakud, R. Biswal, O. Prakash, S K Dixit; Fibre Grating Lab, FSOSS, Raja Ramanna Centre for Advanced Technology, Indore-452013; **Email:** [smitta@rrcat.gov.in](mailto:smitta@rrcat.gov.in)

This paper presents the study of gamma radiation effects on Fiber Bragg Gratings (FBGs) inscribed in different photosensitive fibers. These FBGs were inscribed indigenously using high repetition rate (5.5 kHz) 255 nm radiation, in hydrogen loaded high germanium doped fiber, high germanium doped fiber and boron germanium codoped fiber. All observations in this study were made in real time. All of these FBGs showed a red Bragg wavelength shift (BWS) initially. After attaining a certain maximum BWS, these FBGs showed a blue BWS up to 500 kGy. Highest BWS of 40 pm was observed for the FBG inscribed in hydrogen loaded high germanium doped fiber at 200 kGy gamma radiation dose.

### CP-10-3. LASER BASED OPTICAL FIBER TECHNIQUE FOR VELOCITY MEASUREMENT

Pankaj Deb, Premananda Dey, Avneesh Dubey, Karuna Sagar, A Appa Rao, Rohit Shukla, Archana Sharma, PPEMD Division BARC, Visakhapatnam, **Email:** [pankajdeb24@gmail.com](mailto:pankajdeb24@gmail.com),

The paper illustrates the measurement system to determine the projectile velocity in plasma environment. The measurement system is employed in electromagnetic railgun experiment to determine the muzzle velocity of projectile. The design of the system consists of Laser source, Optical Fiber and Photodetector. It is based on the projectile time of flight in cutting of optical fiber and distance between the optical fiber.