

# Seminar

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## Institute for Plasma Research

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**Title :** Novel Quench Detection Technique in Pulsed Superconducting Magnets

**Speaker:** Dr. Subrata Pradhan

Institute for Plasma Research, Gandhinagar

**Date :** 6th June 2018 (Wednesday)

**Time :** 03.30 PM

**Venue :** Seminar Hall, IPR

### **Abstract :**

Pulsed superconducting magnets are inherently inductively coupled. Irrecoverable loss of superconductivity in a practical superconducting magnet is commonly referred as 'quench'. The 'quench' event detection with reasonable certainty in inductively coupled magnets or within different sections of the same large magnet is both cumbersome and challenging. Prompt detection of the 'quench' event and subsequent extraction of energy from the superconducting magnet concerned are absolutely essential in practices. These actions prevents excessive body thermal stresses within the superconducting magnet, reduces voltage break-down possibilities within the magnet winding packs and electromagnetic fatigue of the same. Practical challenges in detecting quench have been towards primarily cancelling very high inductive noise cancellation in the quench detection circuit and extracting very small 'normal zone' resistive voltages. The detection of the 'location of the quench region within the winding pack' in inductively coupled magnets are also of practical interest. This talk will discuss briefly about the 'quench phenomena' in superconducting magnets, challenges of 'detecting quench event' in both space and time in inductively coupled pulsed superconducting magnet, a novel method and its validation towards detecting quenches experimentally carried out on a high temperature superconducting prototype magnet etc. This novel technique can be extended to large magnet systems having assembled pulsed superconducting magnets such as in Tokamak, accelerators, high gradient magnetic separators and in similar applications.

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