

## **Seminar**

### **A Broadband Atomic Magnetometer Based NMR Spectrometer**

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Atomic magnetometers are being used to detect NMR spectra in the frequency range of a few hundred Hz, especially for detecting J-spectra in zero magnetic field. In order to detect zero-to-ultralow-field (ZULF) NMR signals from samples with stronger J-couplings or in systems like solids, where the dipolar and quadrupolar couplings are more prominent, a magnetometer with a wider bandwidth is necessary. In this seminar, I will present the design and development of an atomic magnetometer with a sensitivity of around  $1 \text{ pT}/\sqrt{\text{Hz}}$  and a bandwidth of 24 kHz. The presentation will also discuss the building of an NMR spectrometer incorporating this atomic magnetometer along with a nuclear spin control system. Furthermore, the presentation will examine the theoretical aspects of zero-field NMR and our implementation of certain pulse sequences, such as spin echoes, at low magnetic fields.

***Tuesday, Jan 7<sup>th</sup> 2025***

***16:00 Hrs (Tea / Coffee 15:45 Hrs)***

***Auditorium, TIFRH***