

Internal Seminar

Magneto-Optical Magnetometry: Measuring Weak magnetic field produced by Hyperpolarized Xenon

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The nuclear-spin polarization of Xenon 129 achieved by spin-exchange optical pumping is much higher than polarization achieved by thermal polarization in high magnetic field. Magnetometer based on magneto-optical rotation is capable of detecting this nuclear-spin polarization of Xenon by measuring the magnetic field produced by polarized spins.

When a linearly polarized light propagate through a medium with longitudinal magnetic field, the plane of polarization of light is rotated and is called Faraday rotation or magneto-optic rotation. This principle can be used to measure unknown magnetic field using a calibrated magneto-optical rotation magnetometer. The magnetometer consist of Rubidium 85 and 87 as optical medium, External Cavity Diode Laser as source giving linearly polarized light, μ metal shield and various optics to measure rotation of plane of polarization. Saturated absorption spectrum of Rubidium is used as reference to select laser frequency. In order to prevent drift of laser frequency from atomic resonance due to temperature fluctuations and environment vibrations, a LabVIEW based laser frequency stabilization program was written.

Tuesday, Aug 29th 2017

04:00 PM (Tea/Coffee at 03:45 PM)

Auditorium, TIFR-H (FReT-B)