

## PH 581: PHYSICS LABORATORY III (0-0-6: 3)

**Faraday Rotation:** Verdet constants of glass and water from measurements of the rotation angle as a function of the magnetic field strength.

**Fibre Optics:** Study the basic structure and types of the optical fiber, measure the numerical aperture and output power.

**Michelson Interferometer:** Measurement of Wavelength, Air's Refractive Index and Glass Dispersion.

**Kerr Effect:** Quadratic electro-optic effect.

**Zeeman Effect:** Study the splitting of degenerate energy levels in mercury under application of a strong magnetic field.

**Fabry-Perot Etalon:** Very precise measurement of the wavelength of a spectral line.

**Jamin Interferometer:** To study the optical path difference caused by various objects.

**Mossbauer Effect:** Study changes in the nuclear spectrum of  $^{57}\text{Fe}$  in different materials to determine the local magnetic and electronic environment.

**Muon Lifetime:** Measure speed of cosmic-ray muons and infer relativistic effects; measure the lifetime of muons decaying at rest.

**Nuclear Magnetic Resonance:** Measure the proton magnetic moment, and verify that the spin  $1/2$  proton is not a Dirac particle.

**The Franck-Hertz Experiment:** Confirms the prediction of quantum theory that electrons occupy only discrete, quantized energy states.

**Text Books & References:**

1. N. Menn, "Practical Optics", Elsevier Academic Press.
2. H. S. Hans, "Nuclear Physics: Experimental and Theoretical", New Age International.
3. R. S. Sirohi, "A course on Experiments with He-Ne lasers", New Age International.