Lab project M2 PPN

Monday & Tuesday from Nov. 2026 to March 2027

Title of the project: Faraday rotation in Terbium doped tellurite glasses

Supervisor(s): P. Mathey, C. Strutynski, F. Desevedavy, G. Gadret

Laboratory / Department / Team : ICB / SAFIR / Verres

Collaborations:

Summary:

This internship involves two main areas of focus: glass synthesis and optical experimentation.

The objective is to explore Faraday rotation in magneto-optical glassy materials. The glasses of interest are tellurite since they appear promising due to the high value of the Verdet constant, especially in the near infrared, offering the possibility of application like optical isolator.

The tellurite glasses with different doping of rare earth (RE) elements like Terbium will be synthesized at the laboratory. The ternary diagram of the glass was partially established during a previous study; it will need to be confirmed for certain compositions and completed. The possibility to combine two RE will be investigated. The glasses will be characterized by their transmission spectra, X-ray diffraction, fluorescence spectrometry. The measurement of the optical rotation (Faraday angle) will be conducted in function of several parameters like the wavelength, the magnitude of the magnetic field, the temperature.

The theoretical aspect of the internship involves the understanding of the influence of paramagnetic ions on the overall performance of the material.

The experimental part of the internship focuses on participating to the synthesis of the glasses and their characterization to verify the results obtained through previous studies.

Reference: Complex Faraday Rotation in Microstructured Magneto-optical Fiber Waveguides, M.AA. Schmidt et al., Advanced Materials 2011, 23, 2681-2688.

Type of project (theory / experiment):): theory and experiment

Required skills: electromagnetism in materials