UNIVERSITÄT BERN

**Seminar über Biomedizinische Photonik**

**Referent/in:** Yves Steiner, Master Student, IAP, University of Bern

**Titel:** Monte Carlo simulation of polarized light scattering in non-isotropic media

Observing and modeling the behavior of biological tissues is a challenging task, due to their complex microstructure and the multitude of different structures that are difficult to separate via traditional optical methods. One promising approach for improving our understanding of tissue architecture is polarimetry, the study of the polarization state of light. Changes in polarized light after interaction with any medium can be fully described by the Mueller matrix, a 4x4 matrix that contains all necessary polarization information. Analysis of Mueller matrix elements enables the segmentation of tissues, such as healthy and cancerous regions. This seminar will discuss the extensions made to an existing Monte Carlo simulation framework by incorporating cylindrical scattering structures to better represent fiberous tissues, such as the white matter of the brain. In particular, the effects of birefringent cylinders within a simulated environment are investigated through their impact on the resulting Mueller matrix. This aims to enhance the physical realism of polarization-based tissue modeling and contribute to improved interpretation of polarimetric measurements in biomedical applications.

**Zeit:** Wednesday 4.3.2026, 10:15 Uhr

**Ort:** Room A97, ExWi, Sidlerstrasse 5, 3012 Bern