

Seminar über Biomedizinische Photonik

Referent/in: Omar Rodríguez-Núñez, Department of Neurosurgery, Inselspital, University Hospital Bern

Titel: Wide-field Imaging Mueller Polarimetry as a potential navigation tool during Brain Tumor Surgery

Intraoperative identification of the border between healthy brain and tumor tissue is often difficult for neurosurgeons. Poor delineation of tumor boundaries represents a risk factor for incomplete resection and postoperative neurological deficits. Despite recent advances in existing intraoperative imaging techniques (e.g. the use of ultrasound imaging, magnetic resonance imaging or neuronavigation systems), tumor tissue is often difficult to differentiate from healthy tissue during surgery.

In this talk we explore the potential of wide-field imaging Mueller polarimetry (IMP) for the visualization of fiber tracts of healthy brain by measuring the optical anisotropy and scattering properties of brain tissue. Identifying the fiber tracts based on their spatial orientation reconstructed from IMP data during brain surgery would allow the delineation of “fiberless” tumors for safe and complete brain tumor resection. We implemented IMP system operating in a visible wavelength range to visualize the white matter fiber tracts using the maps of depolarization, scalar linear retardance and azimuth of the optical axis (polarimetric markers) calculated from the recorded Mueller matrix images.

Results obtained with the polarimetric imaging system in different brain specimens featuring tumor and non-tumor tissue and under different experimental conditions will be discussed. Our results demonstrate that for the assessed sections of brain tissue, the presence and orientation of white matter fiber tracts are clearly detectable using polarimetric markers.

Zeit: Mittwoch, 13.12. 2023, 10:15 Uhr

Ort: **Hörsaal A97**, Gebäude Exakte Wissenschaften, Sidlerstrasse 5, Bern, Schweiz