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**Master Thesis:**

**Characterization of laser-driven plasma emission of biological tissues (Duration: 6 months)**

**Description:**

In laserosteotomes, the type of tissues being cut has to be identified, otherwise, critical structures of the body under the focal spot of the laser beam are prone to inadvertently ablation. This limitation can be improved by connecting the laserosteotome to an optical detection system which could differentiate the different type of tissues. LIBS (Laser-induced Breakdown Spectroscopy) is a potential optical method for this application. In LIBS, the light emitted from the ablation spot, which corresponds to the recombination spectra of ionized atoms and molecules, is collected with a spectrometer to resolve the atomic composition of the ablated sample. After collecting the spectrum, some post proceeding analyses are required to classify the different group of the samples. This analysis could be based on the ratio of intensity, plasma temperature, electron density, or Ionization degree of specific atomic lines. The student in this project is expected to characterize the plasma emission from different biological samples to differentiate soft and hard tissues or normal and cancerous tissues.

**Qualifications:**

- Bachelor degree in Physics/Optics/Biomedical Engineering or closely related field.
- Excellent Bachelor's/Master's grades.
- Programming skills (e.g., Matlab, C++ or LabVIEW) are desirable.
- Prior experience in spectroscopy is a plus (not mandatory).
- Applicants are expected to have excellent language skills in English.

**Tasks:**

- Basic research
- Calculating plasma parameters (electron/ion temperature, electron density, Ionization degree, etc.) for different tissue samples.

**We offer:**

- Opportunity to work in a highly innovative Flagship project with up to 30 researchers.
- You will learn how to perform time-resolved LIBS (Laser-induced Breakdown Spectroscopy) precisely on biological samples.
- Opportunity to enjoy Basel, Basel is a city on the Rhine River in the northwest of Switzerland, located where the Swiss, French and German borders meet.

**Supervision:**

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**Workplace:**

Gewerbestrasse 14, CH-4123, Allschwil, Basel-Land, Switzerland (Room 12.03.003, Lab 12.03.001)

