

# Studentische Arbeit

[x] Master

[x] Diplom

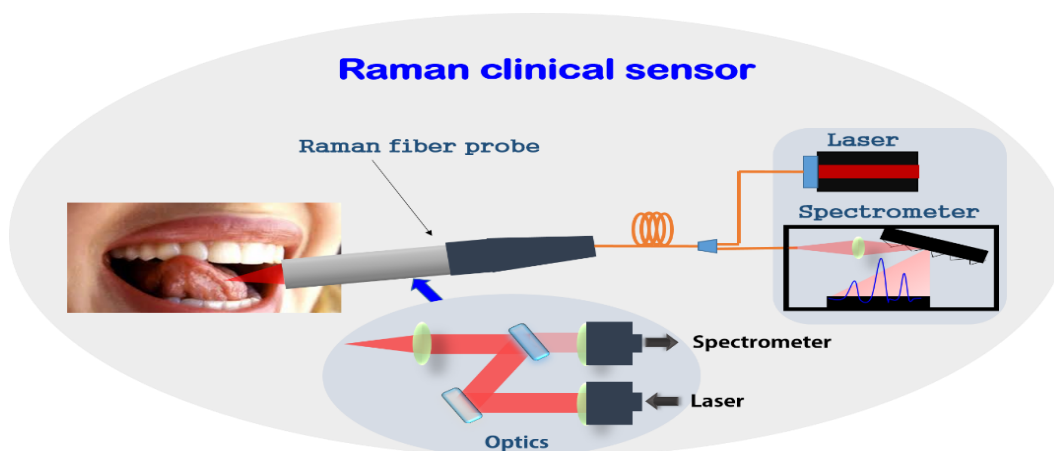
[x] Bachelor

## Raman fiber probe design for biomedical diagnostics

Raman spectroscopy provides molecule-specific information that is unique to the nature of the specimen under investigation. Biological compounds like proteins, carbohydrates, lipids, nucleic acids and deoxyribonucleic acid (DNA) have different molecular constituents therefore their Raman signals are also different. Formation of tumor (cancer cell) significantly changes molecular composition of above mentioned biological materials, thus leads to a change in their Raman spectra. This provides the potential of Raman spectroscopy for identifying cancer diseases such as oral cancer. However, acquisition of high-quality Raman spectra from which biological changes of a specimen can be identified remains one of the main challenges especially for biomedical diagnostics. Thus Raman probe that is capable of collecting high-quality spectrum in a reasonably short measurement time is required.

To achieve above goals of Raman fiber probe: (1) Optical system of the Raman probe that maximizes signal collection from the Raman source generated in the tissue must be developed. This must take into consideration the size of the Raman probe and specification of detection system (spectrometer). (2) The Raman probe must meet the specific requirements for clinical use such as being constructed of biocompatible, non-toxic materials and be sterilisable (or have a sterilizable part).

OpticsStudio (Zemax) will be used to test the collection efficiency of the designed probe and to compare its performance with existing Raman probes.



### Kontakt

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