

Master thesis proposal in applied laser spectroscopy

Laser diagnostics of the human sinuses and evaluation of heating

GPX MEDICAL AB AND DEPARTMENT OF PHYSICS, LUND UNIVERSITY

If you are interested in medical technology, physics, especially laser spectroscopy and hands-on measurements on humans, this is the perfect master thesis project for you!

The project is a collaboration between the Department of Physics, LTH and GPX Medical AB in Lund.

The method of GASMAS, GAs in Scattering Media Absorption Spectroscopy, was developed at the Department of Atomic Physics and is now applied in industry in a diverse number of applications. The technology utilizes tunable diode laser spectroscopy for gas concentration measurement. One medical application is the diagnostics of the human sinuses where the method can provide valuable information on the ventilation stage of the sinus and potentially also measure oxygen gas concentration. Resistance to antibiotics is a severe and increasing threat for humanity. A medical device assessing the ventilation stage may potentially reduce the prescription of antibiotics relating to sinusitis.

As always when working with lasers in medical applications, utmost caution is needed concerning both eye and skin safety. The lasers operate in the near-infrared region and there is a lack of information on heating effects on skin for these wavelengths. This can be assessed by a study using a heat camera and laser illumination.

This thesis project is a hands-on project to perform two different measurement campaigns on healthy volunteers:

- Design and perform a study measuring oxygen and water vapor gas concentrations of the sinuses for some different source-detector configurations.
- Design and perform a heating study to assess the temperature increase versus laser power on skin and also inside the mouth.

Does this seem interesting? Please do not hesitate to contact either Nina Reistad at the Department of Physics, nina.reistad@fysik.lth.se, 046 222 34 74 or Sara Bergsten at GPX Medical AB, sb@gpxmedical.se, 0765 25 79 96.

This project could start earliest January 2019

