Bachelor’s Thesis / Master’s Thesis

Design and Evaluation of a DIY Photometer for Measuring Ozone and Formaldehyde Gas Concentrations

Medical gases, such as ozone, are utilized in pain therapy as an alternative to surgical or medical treatment. Thereby, ozone can be applied for the treatment of herniated disks, chronic wounds, coronary or peripheral artery disease, or osteoarthritis. In order to enable the ozone measurement during the medical treatments, the aim of this thesis is to design and evaluate a DIY photometer for ozone gas measurements in the UV range.

The measurement of ozone is combined with the measurement of formaldehyde, because both are based on a similar measurement principle. Formaldehyde, unlike ozone, is not employed for medical purposes. Instead, it is applied in forensics or pathology. Thereby it is currently not possible to monitor the exposure of the employees, which can be enabled by this DIY photometer.

The thesis includes a literature review of the current state of the art and an outline for the necessary requirements. In addition, the aim is to design, implement, and evaluate the photometer.

Tasks:
- Literature review
- Current state of the art in the field of DIY photometer for ozone and formaldehyde gas measurement
- Requirement profile
- Development and implementation of concepts for a DIY ozone and formaldehyde gas photometer
- Evaluation and calibration of the photometer

Requirements:
- Highly self-motivated student interested in medical technology and computer science
- Experience with Raspberry Pi and Python
- CAD experience (Creo or Inventor)
- Thesis can be written in English or German