

MSc Thesis

Spectral Imaging using a MEMS-based Magnetic Levitation Device

Work Description

Spectral imaging is an emerging technology which combines imaging and spectroscopy to provide a spectrum for each pixel in the image. Due to the large amount of information it can provide about the composition of an object, spectral imaging has found many applications in different fields, such as detection of cancer cells, precision agriculture, and monitoring pollutants in the environment. However, current spectral imaging systems still come with large sizes and high costs, which limits their mobility and wide-scale adoption.

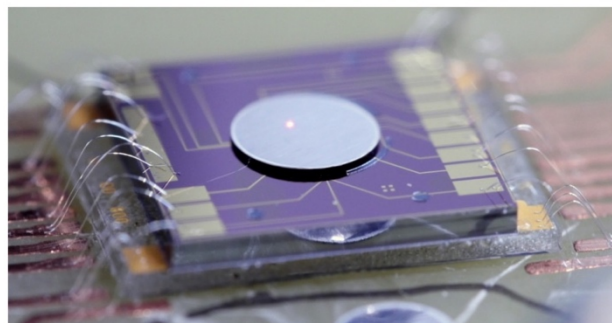
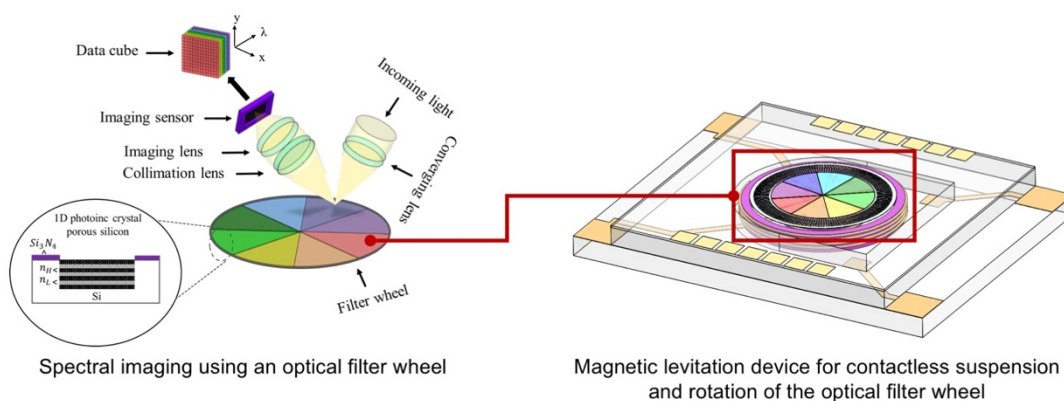
Magnetic levitation is used in applications such as high-speed “MagLev” trains, and magnetic bearings. It allows for the contactless suspension of objects using magnetic force. At our group, we developed a miniaturized device for magnetic levitation featuring wirebonded microcoils.

(Watch this YouTube video: <https://www.youtube.com/watch?v=3Z2cDCugWcU>)

In this project, we aim to combine the techniques of **optics**, **microfabrication**, and **magnetic levitation** to realize a miniaturized levitating optical filter wheel as the key component for a portable, compact, and low-cost spectral imaging system.

We are seeking a highly motivated master student to do his MSc Thesis work on the following tasks:

- Fabrication of the miniaturized magnetic levitation device.
- Adapting the current optical measurements setup for spectral imaging.
- Characterization of magnetic levitation and spectral imaging.



Microfabricated device for magnetic levitation.
(photo courtesy: Dr. Kirill Poletkin)

Starting date: as soon as possible.

Duration: 6 months with possibility to start with HiWi work before the MSc thesis.

Qualifications:

- Experience with lab measurements (electrical/optical).
- Background and interest in microsystems and microfabrication.
- Experience with 2D and 3D CAD design.
- Experience with Zemax, Comsol, Ansys, Matlab would be a plus.
- Independence and reliability.

If you are interested, please send your CV, and a transcript of records to the email addresses below. Suitable candidates will be invited for an interview at KIT-Campus North.

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