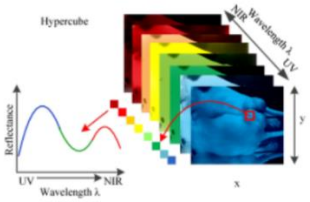
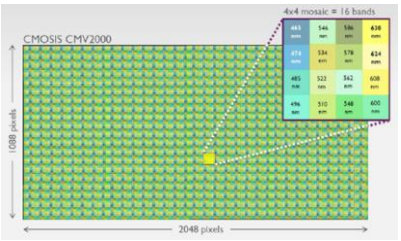
Master Thesis

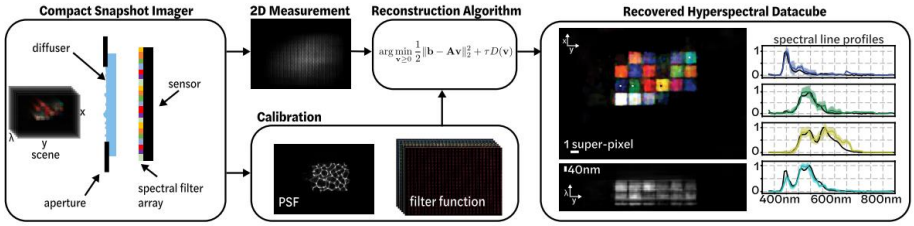
Computational hyperspectral imaging microscopy for dynamic multi-components tracing

Background

The combination of microscopy and spectroscopy, which is called microscale spectroscopic mapping, could offer microscale spatial information with high resolution and extra spectral information, and therefore provides more detailed characteristic information including quantitative information of the imaged area.







Scope

In this work, a hyperspectral imaging microscope using spectral filter array will be built for dynamic hyperspectral data set acquisition. Computational methods will be integrated with the hardware for pixel-wise hyperspectral data reconstruction. This work will provide the opportunity to work on a multidisciplinary topic including advanced imaging, imaging system control, and data processing techniques.

References

(1) Lu, G. and Fei, B., 2014. Medical hyperspectral imaging: a review. Journal of biomedical optics, 19(1), p.010901.
(2) Monakhova, K., Yanny, K., Aggarwal, N. and Waller, L., 2020. Spectral DiffuserCam: Lensless snapshot hyperspectral imaging with a spectral filter array. Optica, 7(10), pp.1298-1307.

Prospective students with high motivation, experience in optics and electronics, as well as experience in multi-dimensional data processing are encouraged to contact me at xingchen.dong@tum.de

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