



## Project U-dQPI

### Quantitative phase imaging for urine sediment analysis

Urinalysis represents a basis for diagnosis and monitoring the progress of various diseases. In addition to chemical analysis, undissolved urine components are assessed microscopically. For this purpose, urine is prepared to determine sedimented components such as cells and crystals. Component composition changes provide information relevant for urological diagnostics. The current gold standard for qualitative analysis of urine sediment is manual microscopy which depends on the individual examiner, his or her experience as well as expertise, and can be time-consuming and costly.

The aim of the project U-dQPI is therefore to develop a novel automated, digital-optical system for urine sediment analysis allowing a fast, precise and reliable sediment diagnosis which is independent of individual examiners. The approach is based on a digital Quantitative Phase Imaging (dQPI) methodology developed at the Biomedical Technology Center. dQPI measures optical path length changes that are induced by particles or cells, from which volume, size, dry mass and morphology related parameters can be retrieved. The combination with novel intelligent software approaches for image analysis prospects a robust and reliable detection individual urine components.

The label-free quantitative imaging-based concept promises increased accuracy and speed. Successful project results will result in a new device for advanced urine sediment analysis and diagnosis of urological diseases improving patient benefits. In addition, U-dQPI contributes to cost effectiveness in healthcare and strength Germany technologically and economically as a business location.

#### Project title

Automated optical analysis of urine sediment using digital Quantitative Phase Contrast Imaging (U-dQPI).

#### Program:

Photonics Research Germany - Light with a Future

#### Support measure:

Preliminary Scientific Projects "Wissenschaftliche Vorprojekte" (WiVoPro): Photonics and Quantum Technologies

#### Project volume

approx. 358,000 euros (100% funded by the BMBF)

#### Project Duration:

01.03.2021 - 28.02.2023

#### Project partners:

Westfälische Wilhelms-Universität Münster - Biomedical Technology Center (BMTZ), Münster

#### Project coordination:

Dr. Jürgen Schnekenburger  
Westfälische Wilhelms-Universität Münster - Biomedical Technology Center (BMTZ), Münster

E-Mail: schnekenburger@uni-muenster.de