Summary of Research Projects

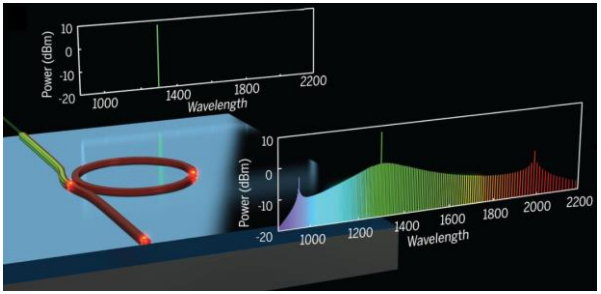
Han Wang
2.14.2021

Outline

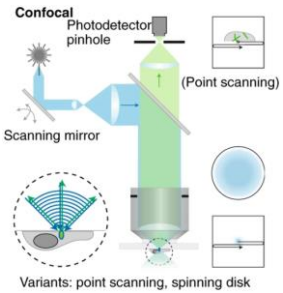
Device

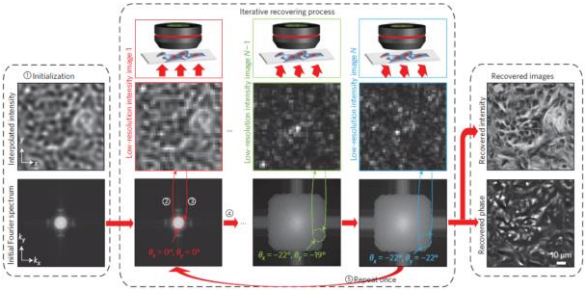
System

Application

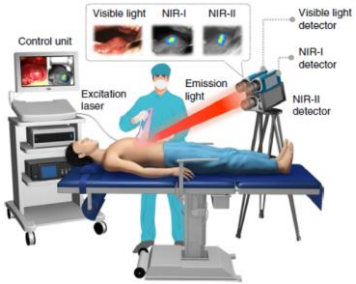


Optical Frequency Comb and Microresonator





Confocal Microscopy and Computational Optical Imaging

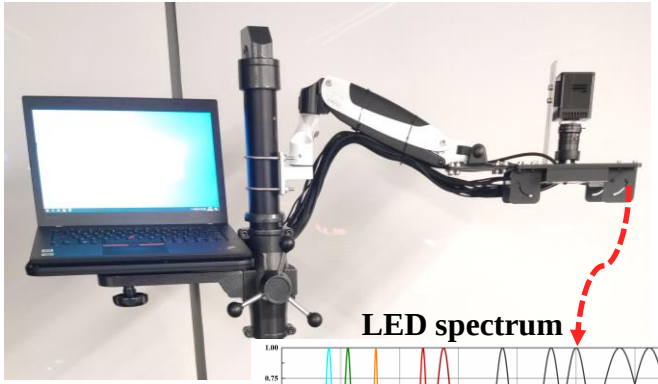


Multispectral and Hyperspectral Imaging for Clinical Diagnosis

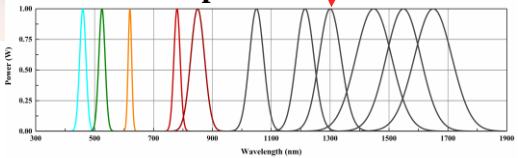
1. *Science* **361**, eaan8083 (2018)
2. *Nat. Cell Biol.* **21,** 72–84 (2019)
3. *Nat. Photonics* **7,** 739–745 (2013)
4. *Nat. Biomed. Eng.* **4,** 259–271 (2020)

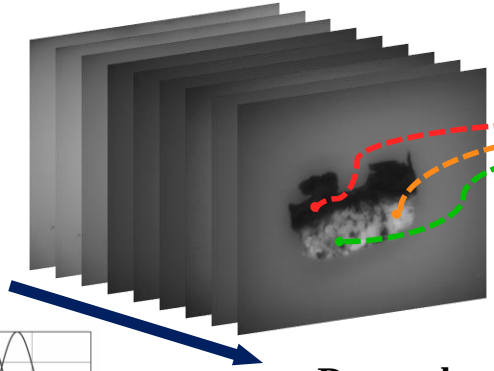
1. 04.2021-01.2022: Multispectral and Hyperspectral Imaging for Clinical Diagnosis

a. Design and Build of Multispectral Imaging Systems

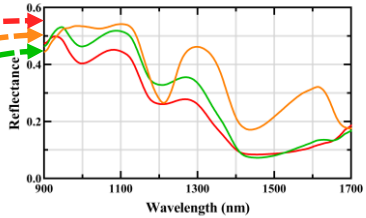


LED spectrum



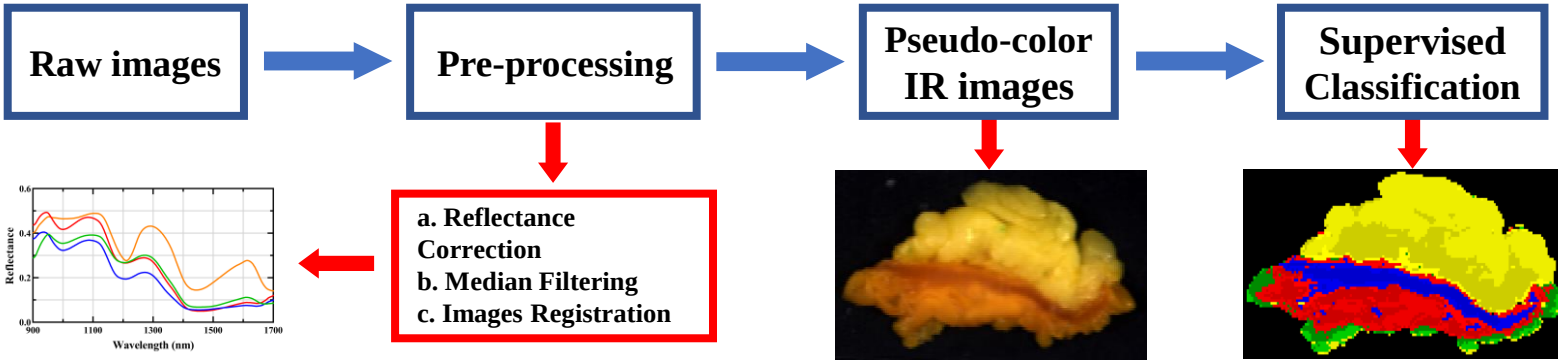


wavelength Data cube



Reflectance spectrum

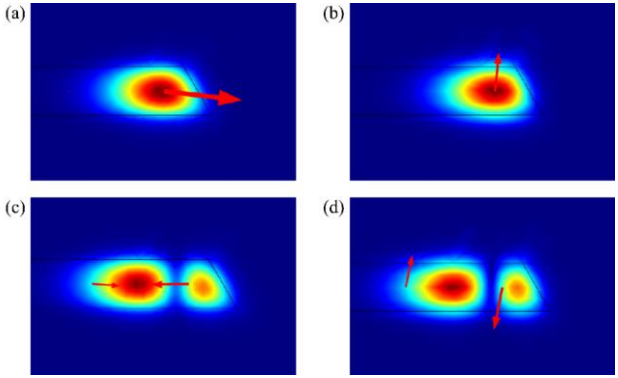
b. Medical Image Processing



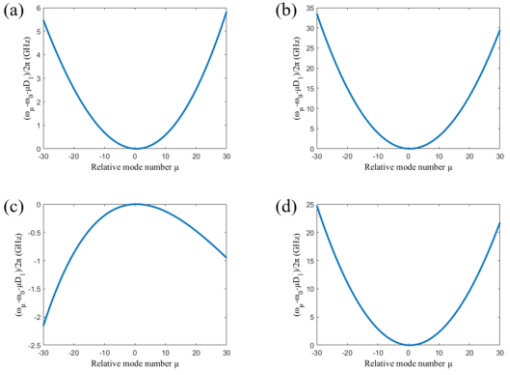
This work was collaborated with Dr. Jun Liao.

2. 11.2017-03.2021: Optical Frequency Comb and Microresonator

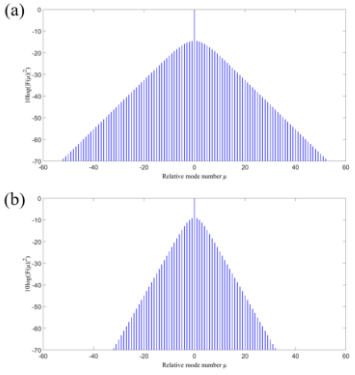
a. Dispersion and Microcomb Simulation



Finite element simulation of the modes

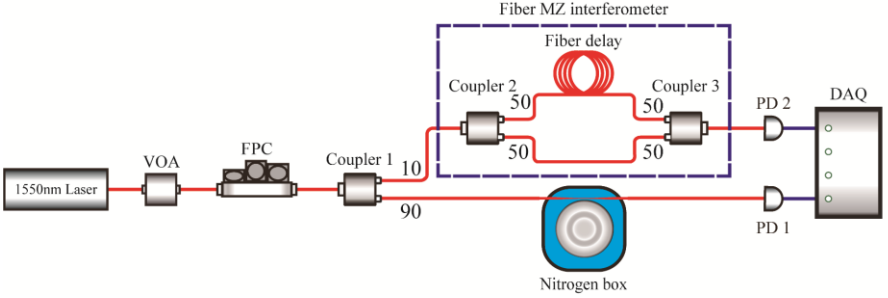


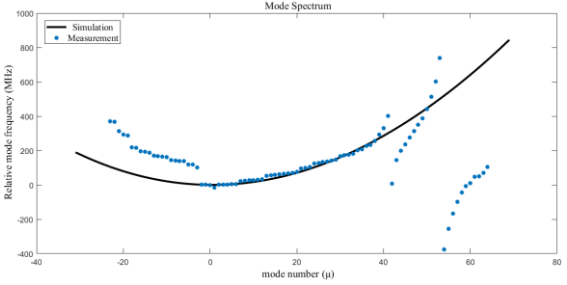
Integrated dispersion profile of the modes



Soliton simulation

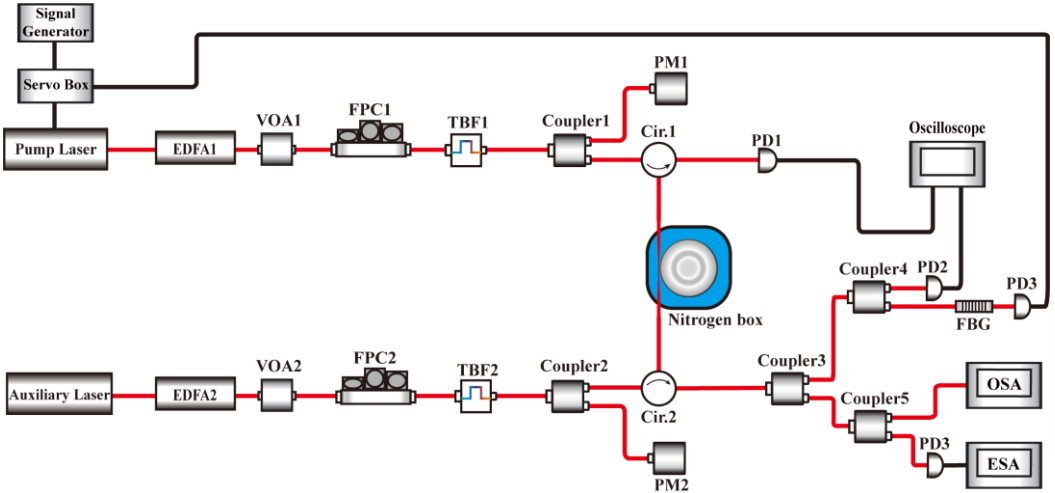
b. Dispersion Measurement

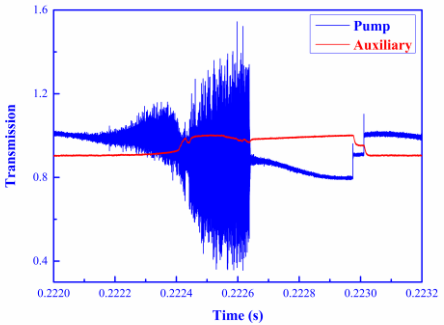




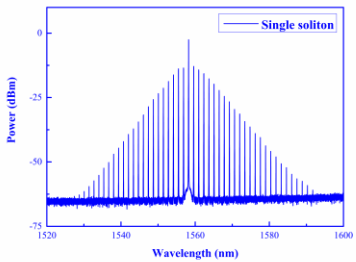
2. 11.2017-03.2021: Optical Frequency Comb and Microresonator

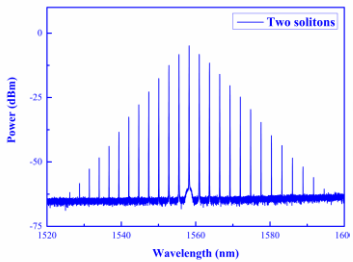
c. Soliton Microcomb Generation at 1550 nm



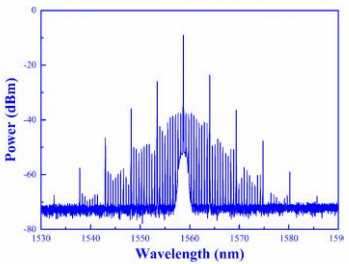


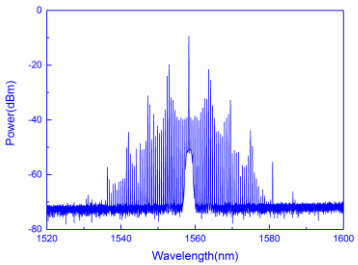
Step transmission spectrum





Soliton microcomb at 1550 nm



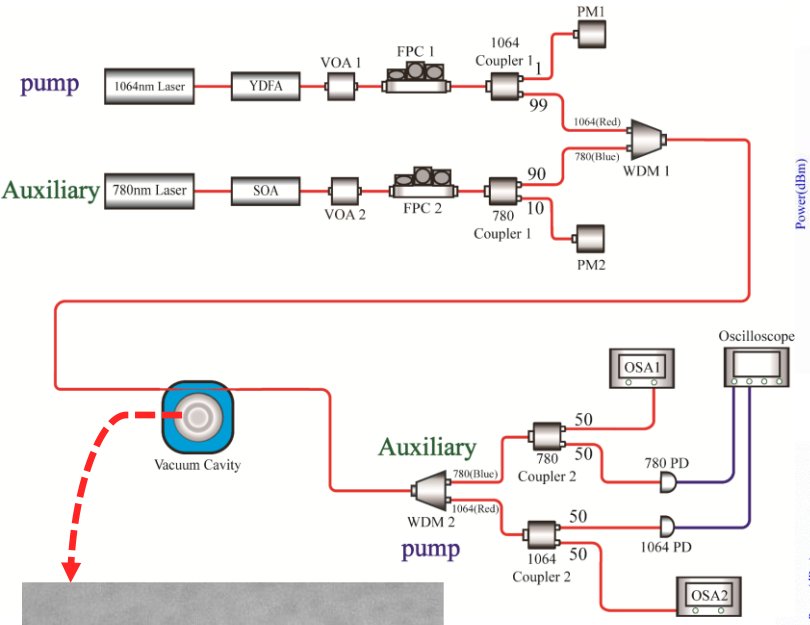


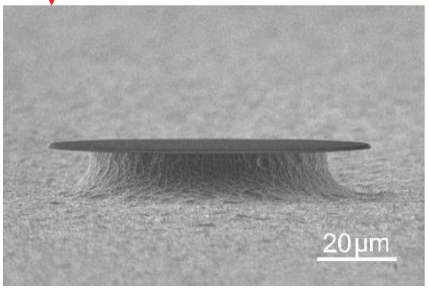
Soliton crystal at 1550 nm

This work was collaborated with Longfu Xiao, and microresonators were prepared by Jiaxin Gu and Jinyi Zhao.

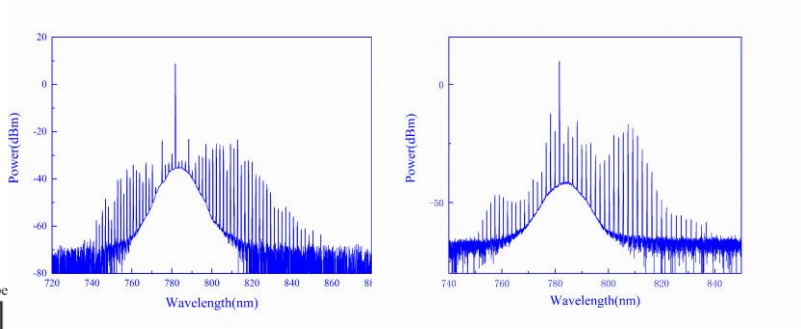
2. 11.2017-03.2021: Optical Frequency Comb and Microresonator

d. Kerr Microcomb Generation at Shorter Wavelength

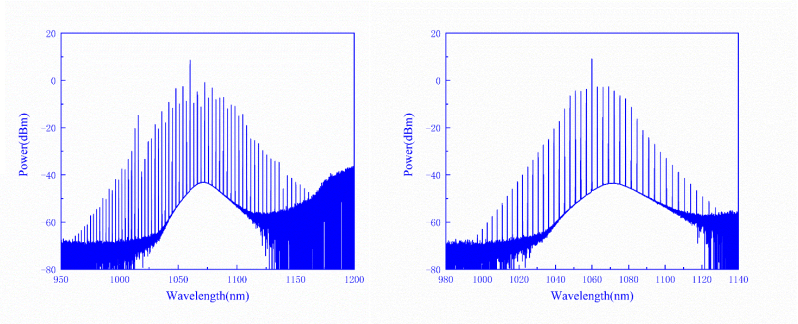




Microdisk resonator



Kerr microcomb at 780 nm

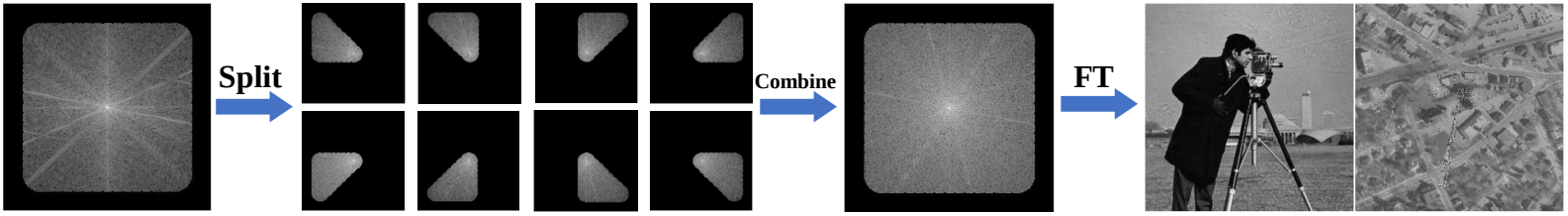


Kerr microcomb at 1060 nm

The microdisk resonator was prepared by Jiaxin Gu.

3. 02.2015-07.2015: Computational Optical Imaging

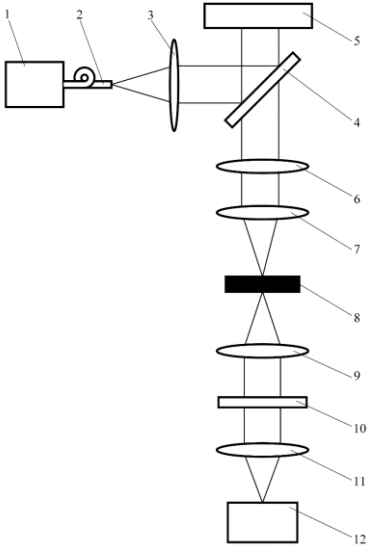
a. Parallel Processing to accelerate calculation

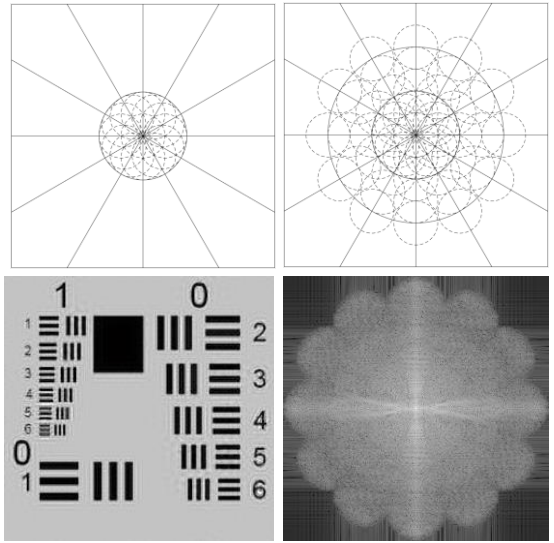


Initial guess | Parallel calculation | Fourier spectrum | Reconstruction result

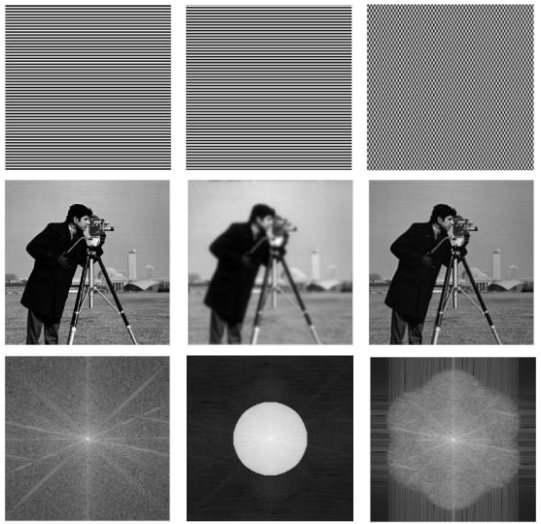
b. Improving Spatial/Time Resolution Using LCD

Spatial Resolution:



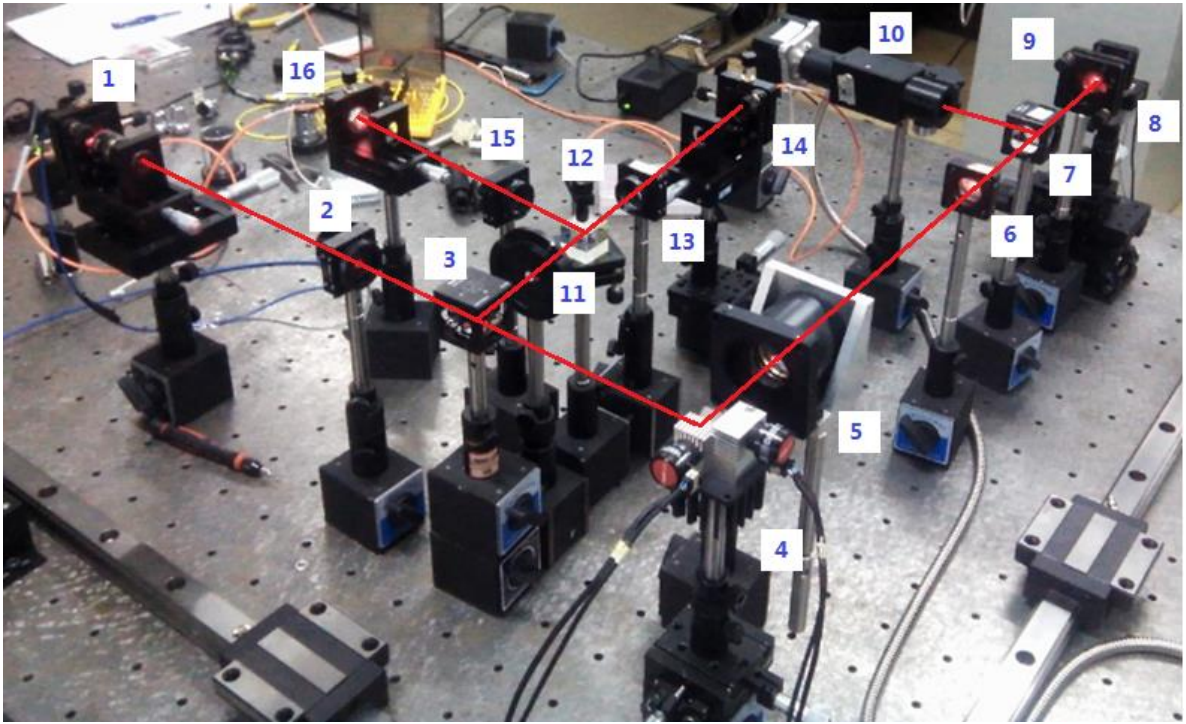


Time Resolution:

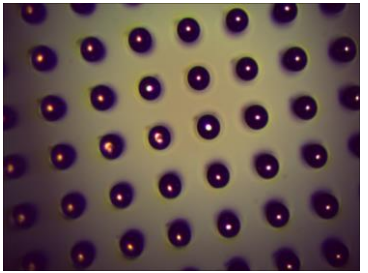


This work was collaborated with Dr. He Zhang.

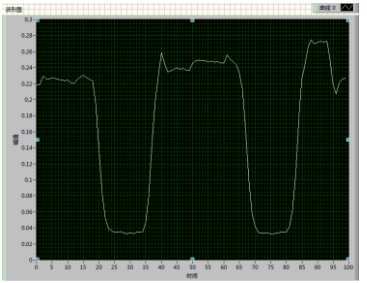
4. 02.2015-07.2015: Confocal Microscopy



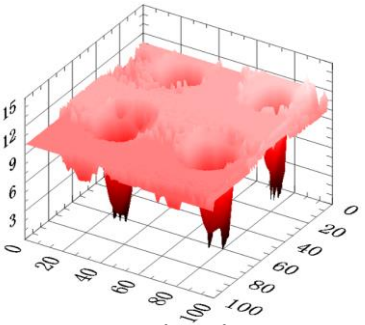
Design and Build of the differential confocal microscope system



Wide-field image



Scanning result



3D reconstruction image

This work was collaborated with Dr. He Zhang.