



Tencent
AI Lab

Summary of Research Projects

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14 Feb. 2022

Outline

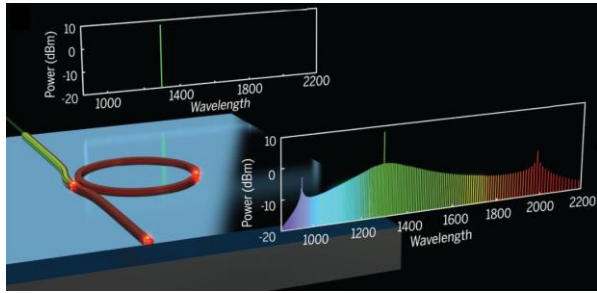
Device



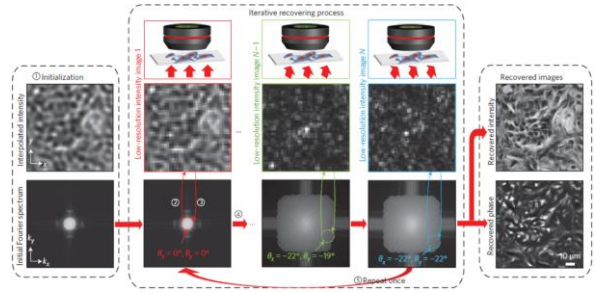
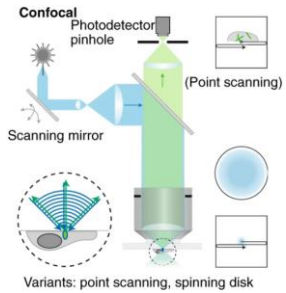
System



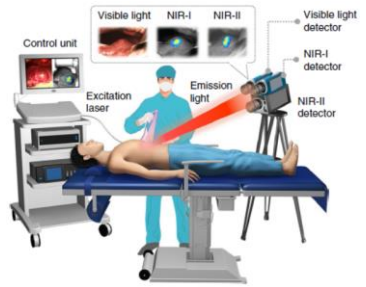
Application



Optical Frequency Comb and Microresonator



Confocal Microscopy and Computational Optical Imaging

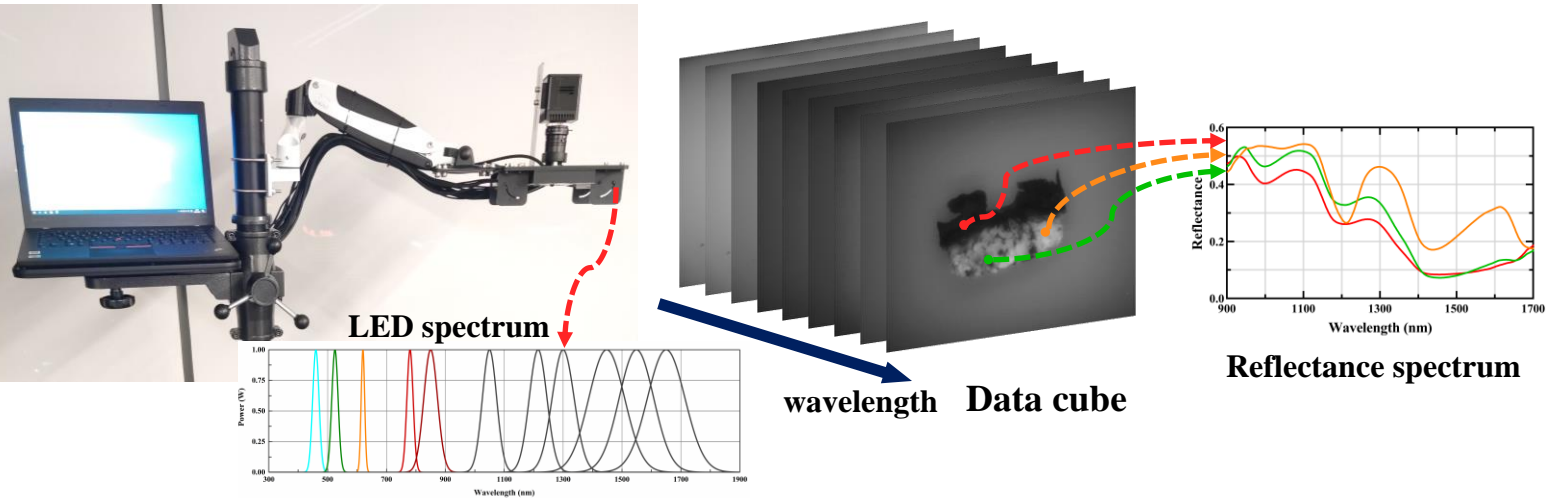


Multispectral and Hyperspectral Imaging for Clinical Diagnosis

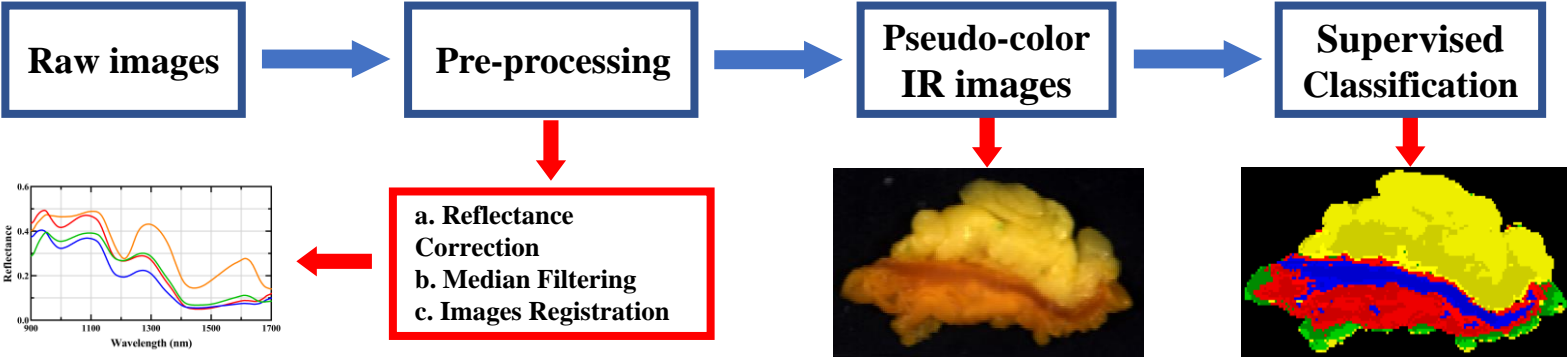
1. *Science* **361**, eaan8083 (2018)
2. *Nat. Cell Biol.* **21**, 72–84 (2019)
3. *Nat. Photonics* **7**, 739–745 (2013)
4. *Nat. Biomed. Eng.* **4**, 259–271 (2020)

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

a. Design and Build of Multispectral Imaging Systems



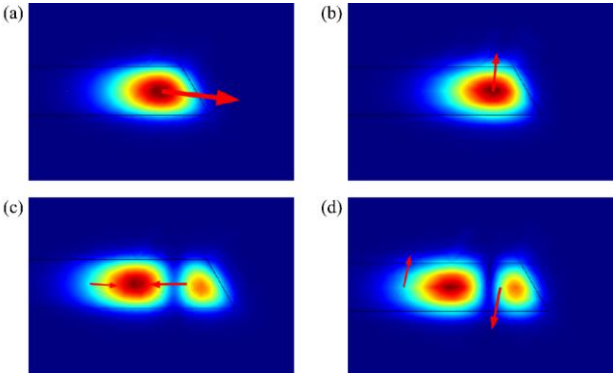
b. Medical Image Processing



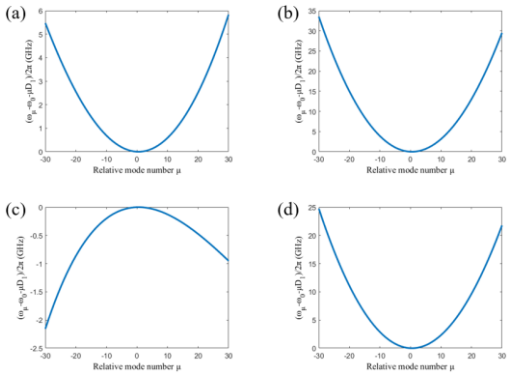
This work was collaborated with Dr. Jun Liao.

2. 11.2017-03.2021: Optical Frequency Comb and Microresonator

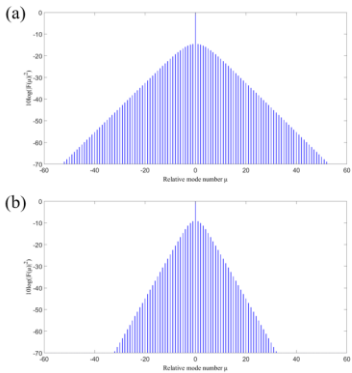
a. Dispersion and Microcomb Simulation



Finite element simulation of the modes

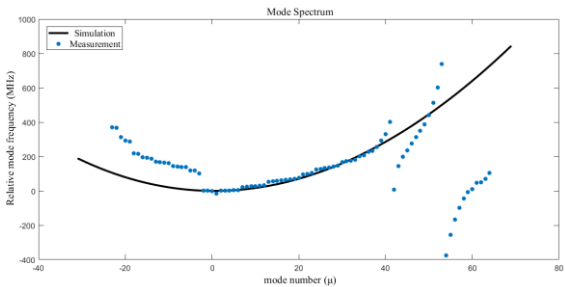
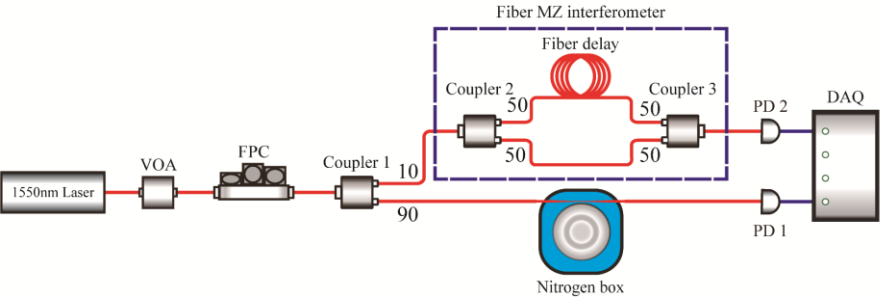


Integrated dispersion profile of the modes



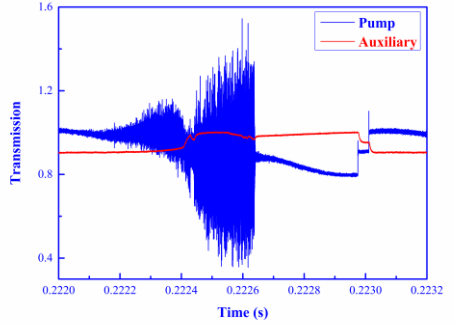
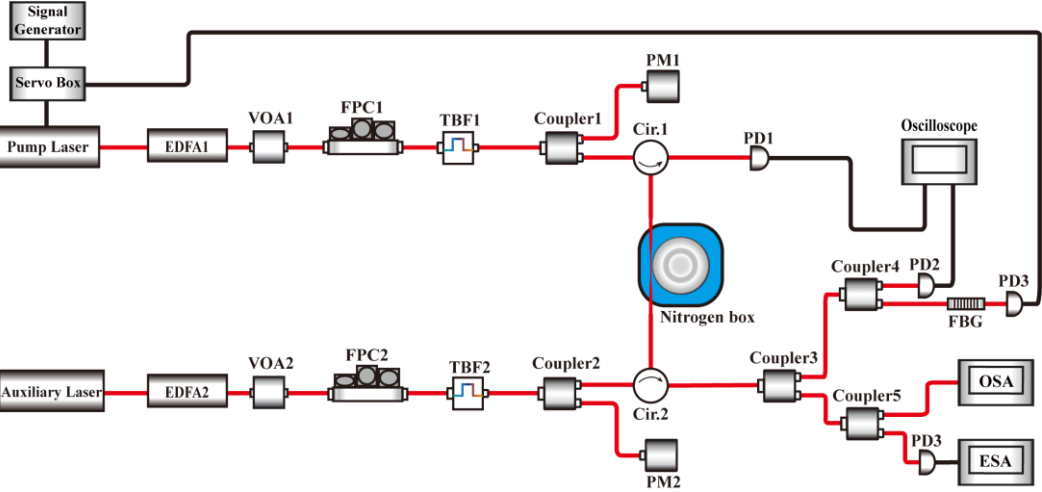
Soliton simulation

b. Dispersion Measurement

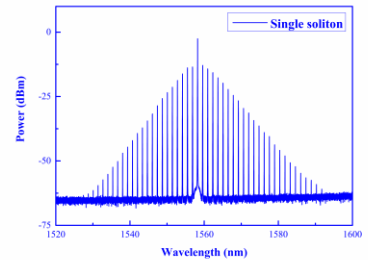


2. 11.2017-03.2021: Optical Frequency Comb and Microresonator

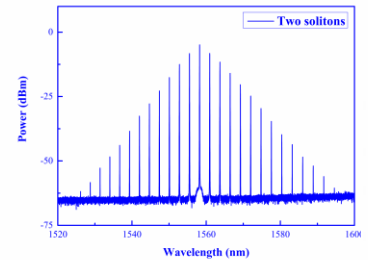
c. Soliton Microcomb Generation at 1550 nm



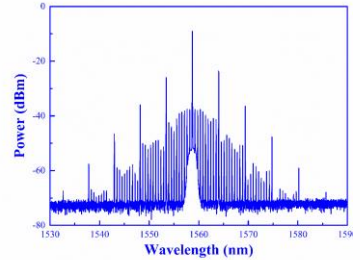
Step transmission spectrum



Soliton microcomb at 1550 nm

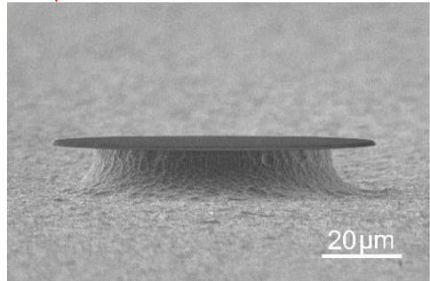
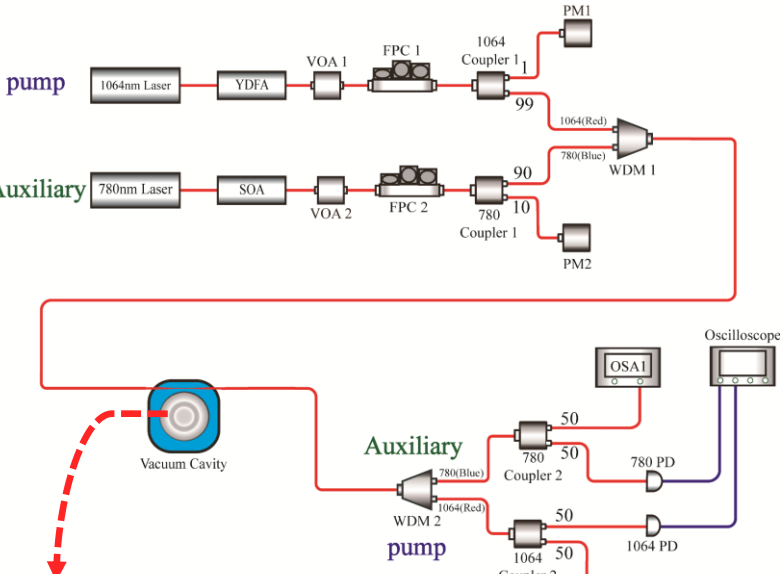


Soliton crystal at 1550 nm

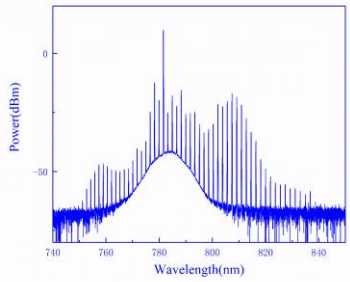
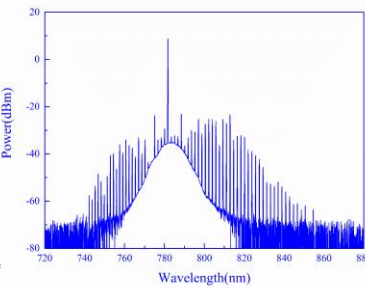


2. 11.2017-03.2021: Optical Frequency Comb and Microresonator

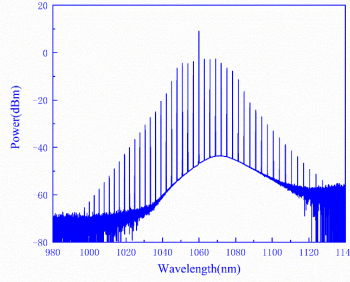
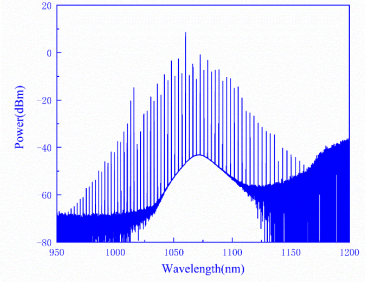
d. Kerr Microcomb Generation at Shorter Wavelength



Microdisk resonator



Kerr microcomb at 780 nm

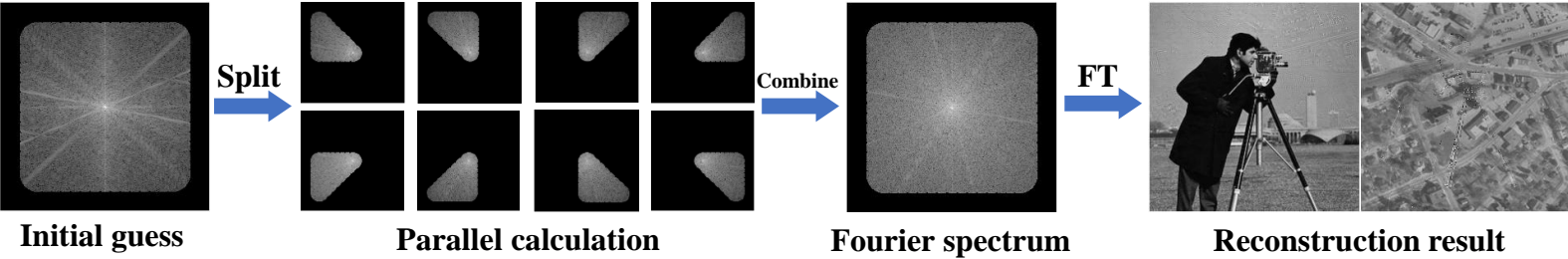


Kerr microcomb at 1060 nm

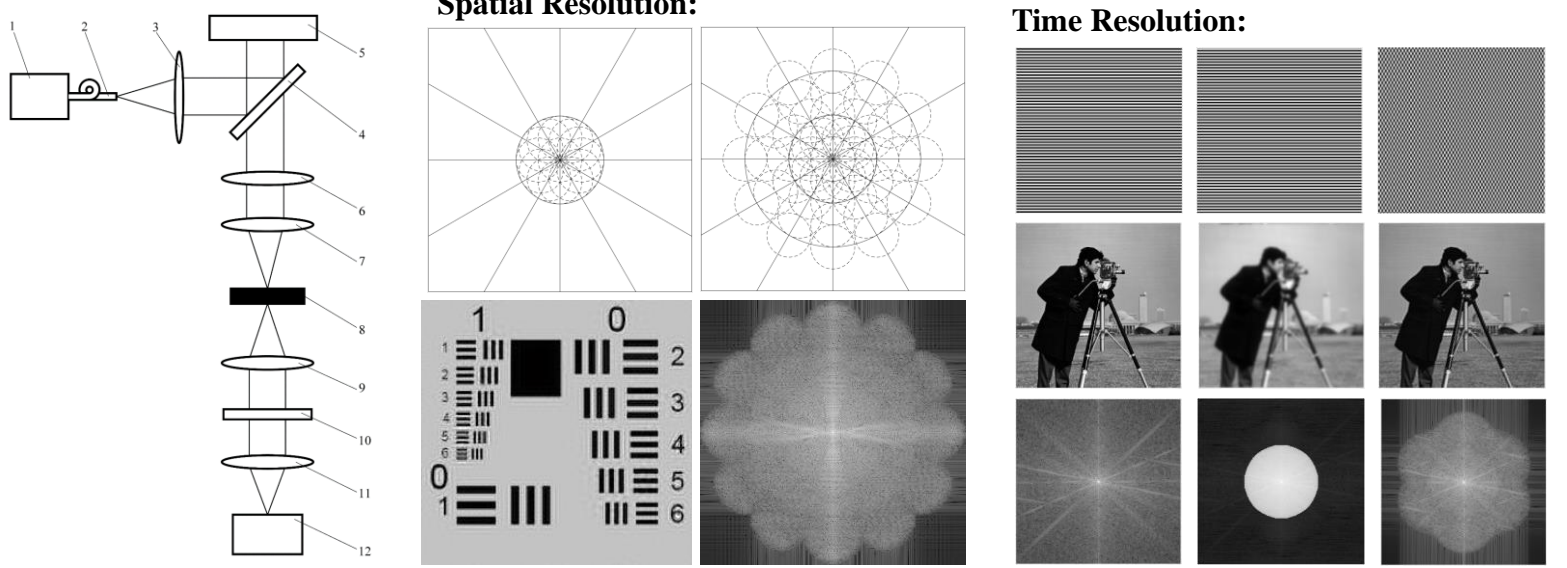
The microdisk resonator was prepared by Jiaxin Gu.

3. 02.2015-07.2015: Computational Optical Imaging

a. Parallel Processing to accelerate calculation

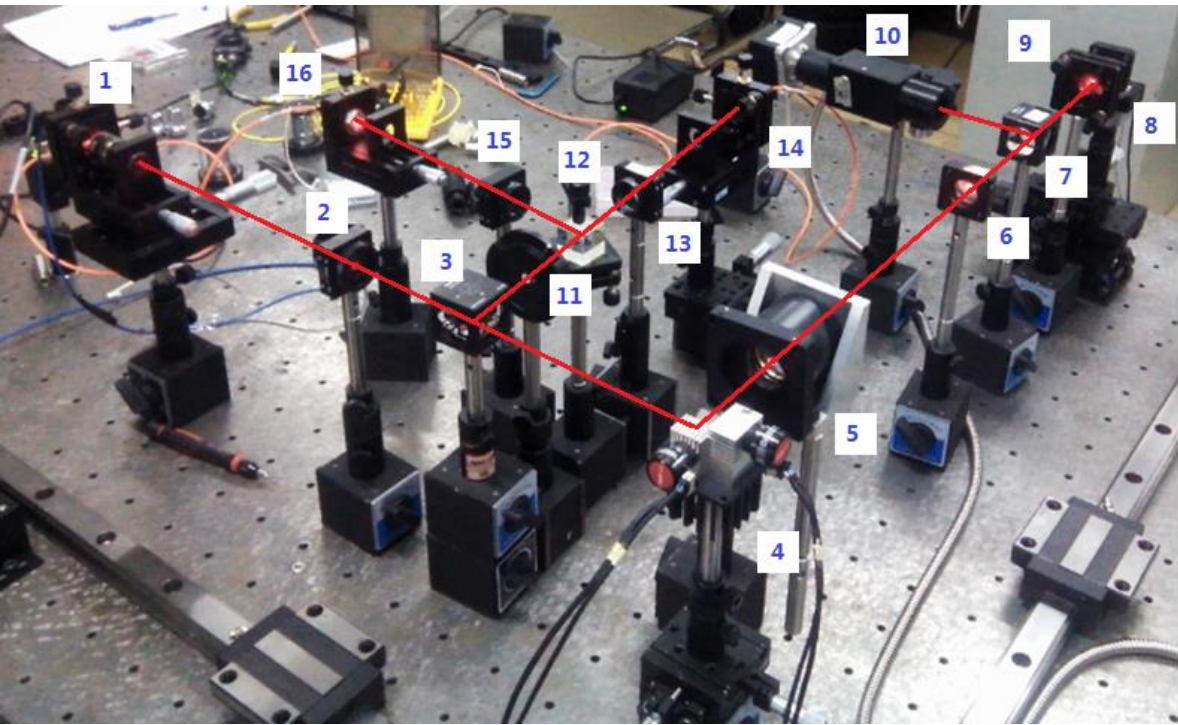


b. Improving Spatial/Time Resolution Using LCD

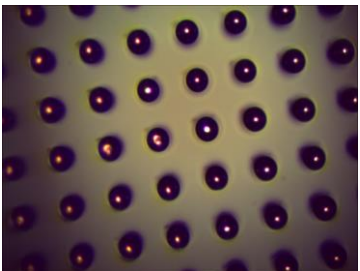


This work was collaborated with Dr. He Zhang.

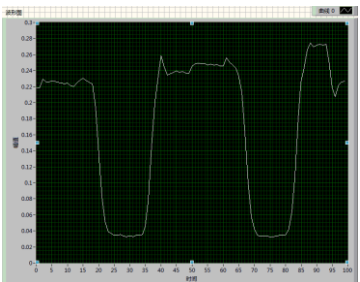
4. 02.2015-07.2015: Confocal Microscopy



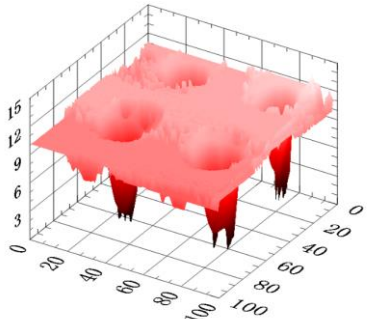
Design and Build of the differential confocal microscope system



Wide-field image



Scanning result



3D reconstruction image 7/7

This work was collaborated with Dr. He Zhang.