DEVELOPMENT OF SUPER-RESOLUTION OPTICAL FLUCTUATION IMAGING: HIGER, FASTER AND DEEPER

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Emerging super-resolution optical fluctuation imaging (SOFI) has attracted great interest owing to its rational balance of spatiotemporal resolution, imaging depth, phototoxicity/photodamage and technical simplicity. SOFI extracts super-resolution information *via* correlation analysis of temporal fluctuation of fluorescent probes, and therefore, blinking fluorescent probes are key to achieving SOFI imaging with high spatiotemporal resolution [1].

In recent years, semiconducting polymer dots (Pdots) have demonstrated great potential in bioimaging because of their ultra-high brightness, strong photostability and superior biocompatibility. For the first time, we designed two types of small photoblinking Pdots and demonstrated SOFI imaging of subcellular structures labeled with these new small Pdots [2]. In addition, we also introduced two types of narrow emissive small photoblinking Pdots (nesPdots) with different colors, blue PFO and near-infrared PFTBT5 nesPdots for multi-color SOFI nanoscopy [3].

To achieving fast 3D deep-tissue SOFI imaging, we presented two-photon super-resolution light-sheet imaging via stochastic optical fluctuation imaging (2PLS-SOFI) technique, taking advantage of large two-photon cross-section and high brightness of quantum dots, up to 3-fold spatial resolution enhancement compared with conventional two-photon light-sheet microscopy and about 40-fold temporal resolution enhancement compared with individual molecule localization–selective plane illumination microscopy (IML-SPIM) were achieved [4].

Follows are the example of references:

[1] X. Chen, Z. Zeng, X. Zhang, P. Xu, & P. Xi, Optical nanoscopy with SOFI. *Super-Resolution Imaging in Biomedicine* (CRC Press, 2016)

[2] X. Chen, R. Li, Z. Liu, ... & Y. Sun, Small photoblinking semiconductor polymer dots for fluorescence nanoscopy. *Advanced Materials*. (2016)

[3] X. Chen, Z. Liu, R. Li, P. Xi, C. Wu, Y. Sun, Multicolor super-resolution fluorescence imaging with narrow emissive small photoblinking semiconducting polymer dots (nesPdots), submitted.

[4] X. Chen, W. Zong, R. Li, ... & Y. Sun, Two-photon light-sheet nanoscopy by fluorescence fluctuation correlation analysis. *Nanoscale*. (2016)