

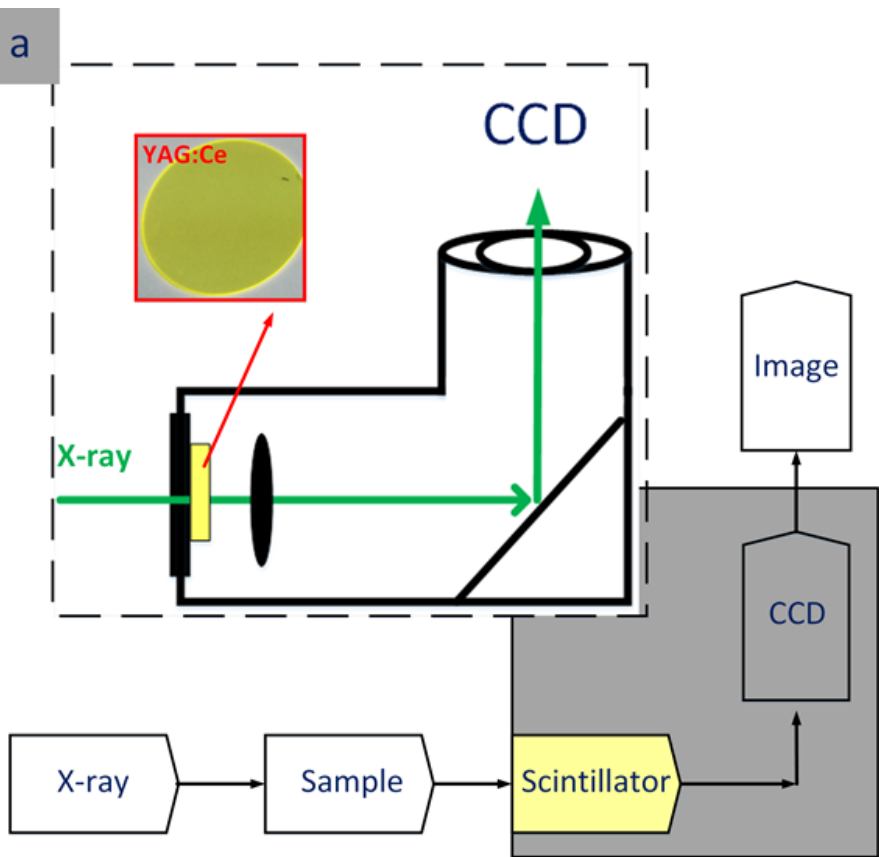
Recent development of scintillation detector in SSRF

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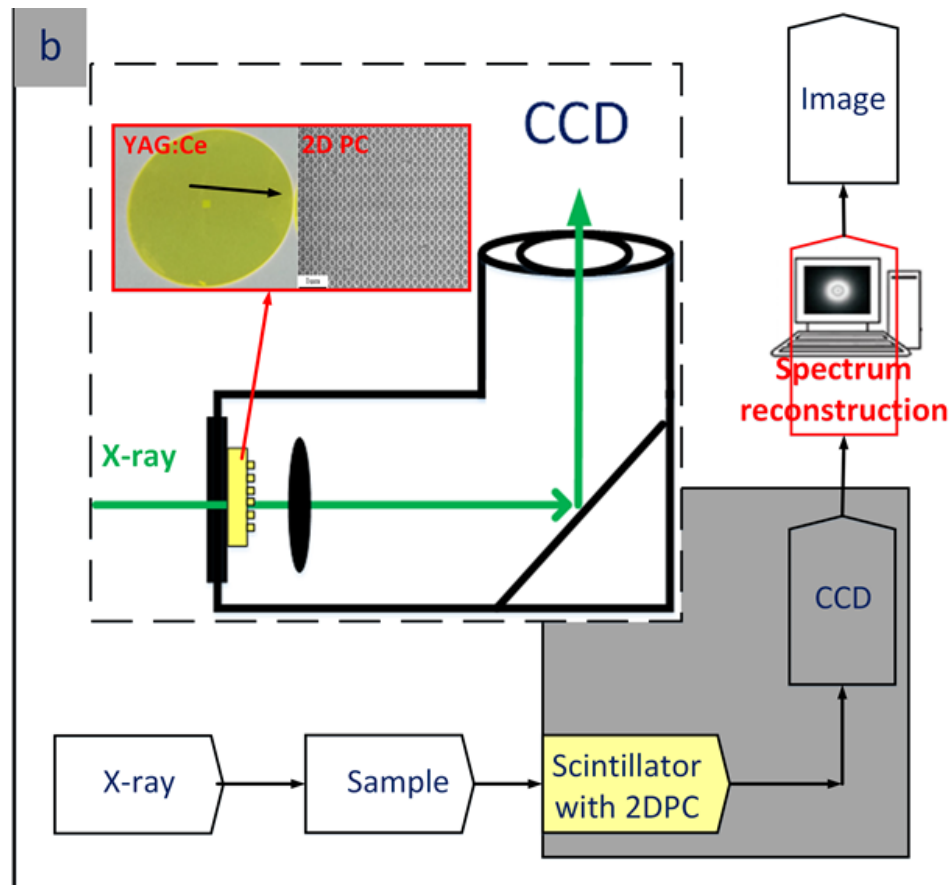


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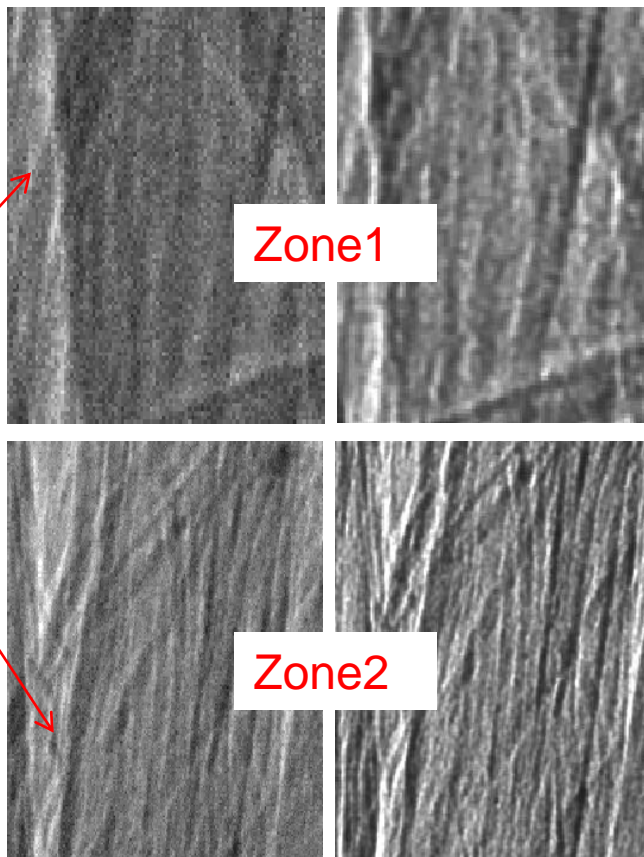
Conventional set up



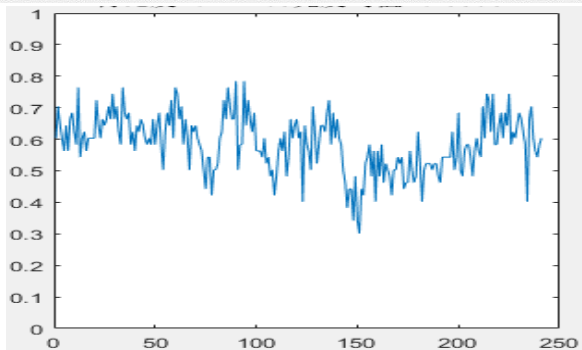
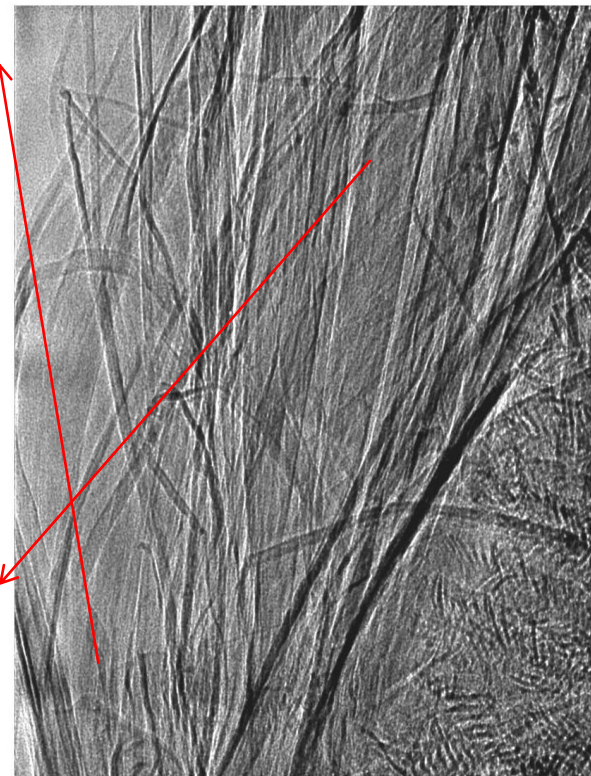
2D-PC + spectrum reconstruction



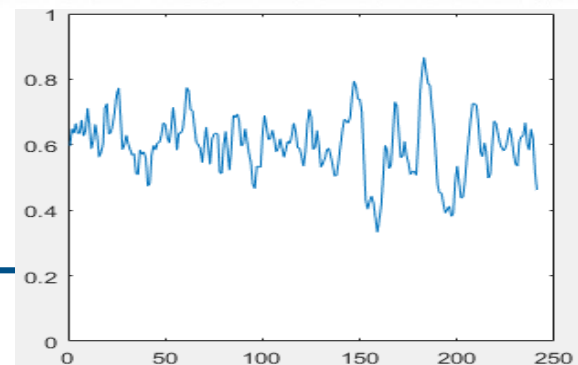
$Q=0.71179$ (without 2D-PC)



$Q=0.42737$ (with 2D-PC + restoration)



Q value
decrease by
39.95%

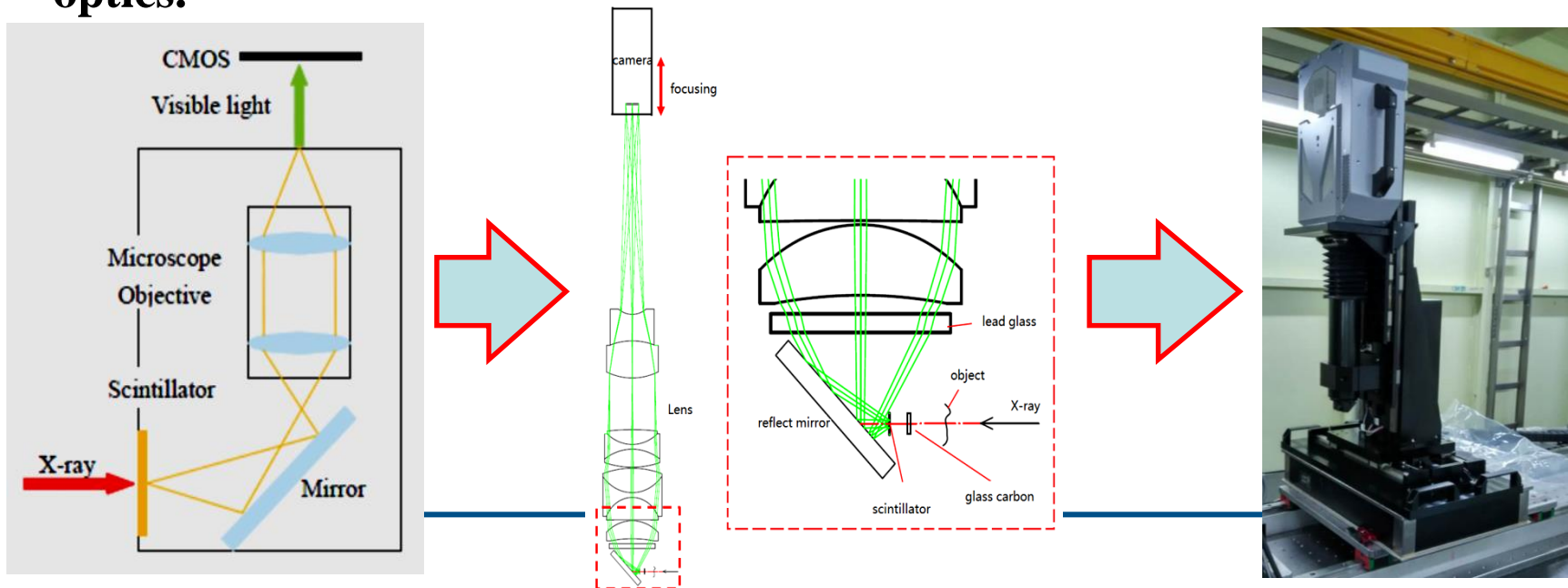


Development of fast X-ray imaging detector

- To meet the user experimental requirement of fast X-ray imaging with the temporal resolution of 100000fps and the spatial resolution of $5\mu\text{m}$.

Scheme:

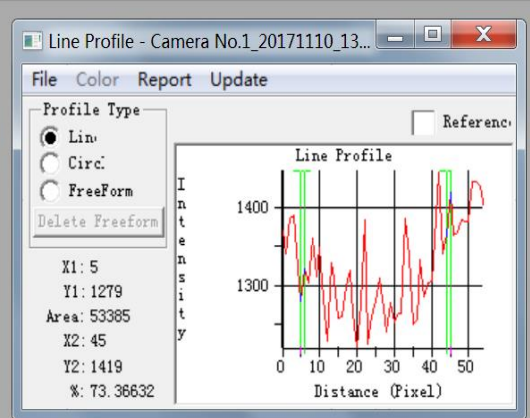
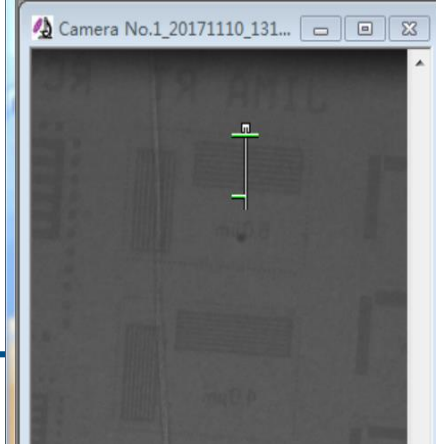
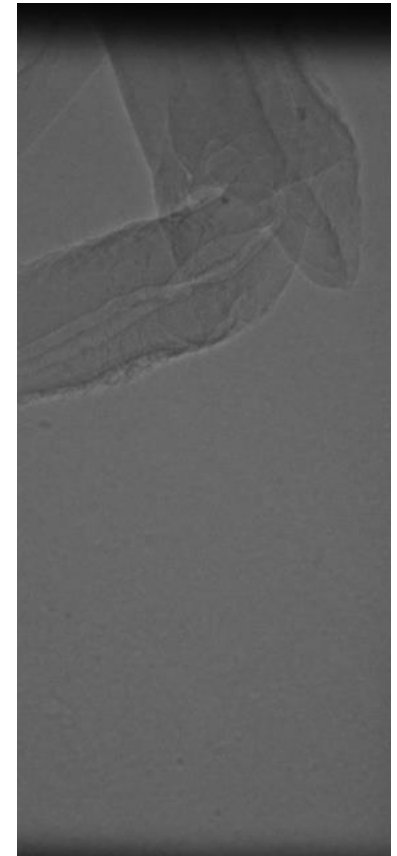
- A microscope optics with large numerical aperture (NA) is designed to gather more photons from the scintillator screen to the CMOS detector.
- The thickness of the scintillator is matched with the NA of the microscope optics.



	Commercial microscope optics with white beam	Developed microscope optics with white beam
Magnification	7.5×	8×
NA	0.21	0.5
Working distance	35mm	31.5mm
Coupling efficiency	3.4%	16.9%

Test results of the developed detector:

- The imaging spatial resolution is up to $5\ \mu\text{m}$ at the frame frequency of 100000fps with white beam of bending magnet source; High imaging contrast can be obtained for biological soft tissue.



The fast X-ray imaging result of the grasshopper leg stretching process at 100000fps and $2.5\ \mu\text{m}/\text{pixel}$



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 SSRF

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