

Integrated Platform for Spectroscopy

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SACLA

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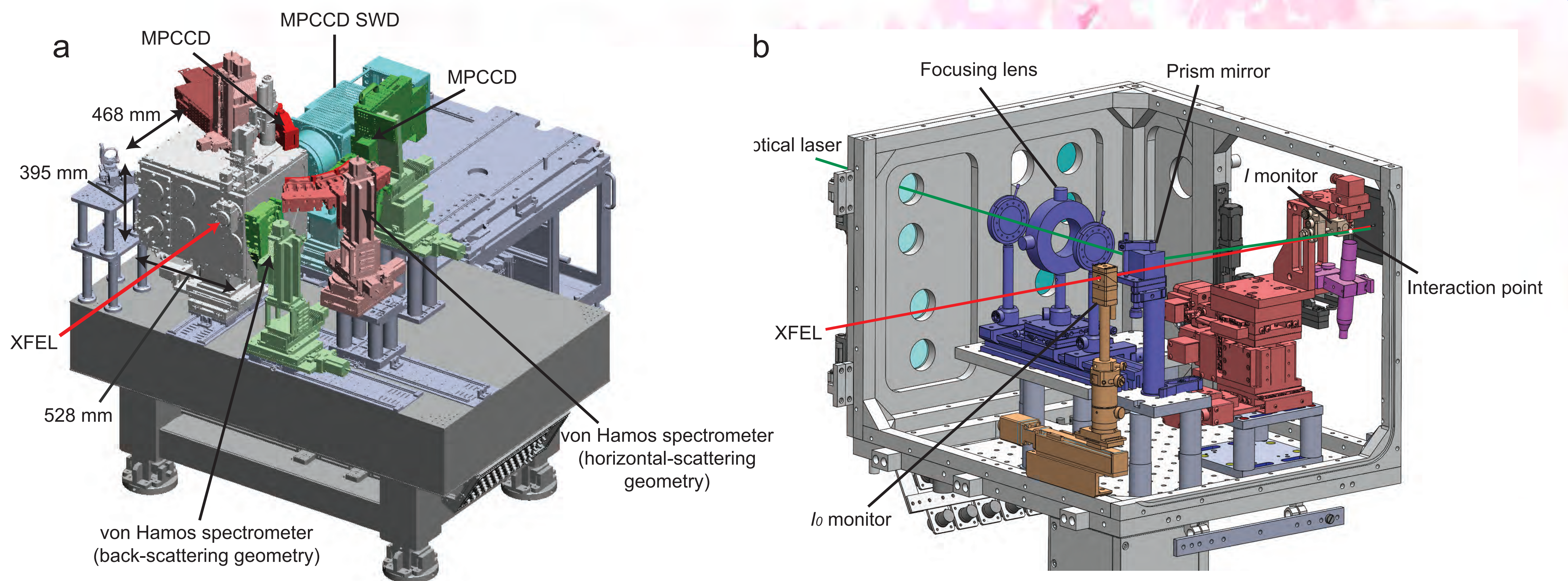
• Ultrafast X-ray science using XFEL

X-ray free-electron laser (XFEL) SACLA has provided an unprecedented opportunity for studies of femtochemistry beyond optical-domain observables. To facilitate optical-pump X-ray-probe measurements of liquid samples at SACLA, we have developed a standard instrument, SACLA Pump-probe INstrumEnt for Tracking Transient dynamics (SPINETT), which covers complementary X-ray techniques, i. e. time-resolved X-ray absorption spectroscopy, time-resolved X-ray emission spectroscopy, and time-resolved X-ray solution scattering.

• Overview

Main components

- Chamber (He compatible)
- 2 Von Hamos spectrometers
- 2 Single MPCCD
- SWD Octal MPCCD

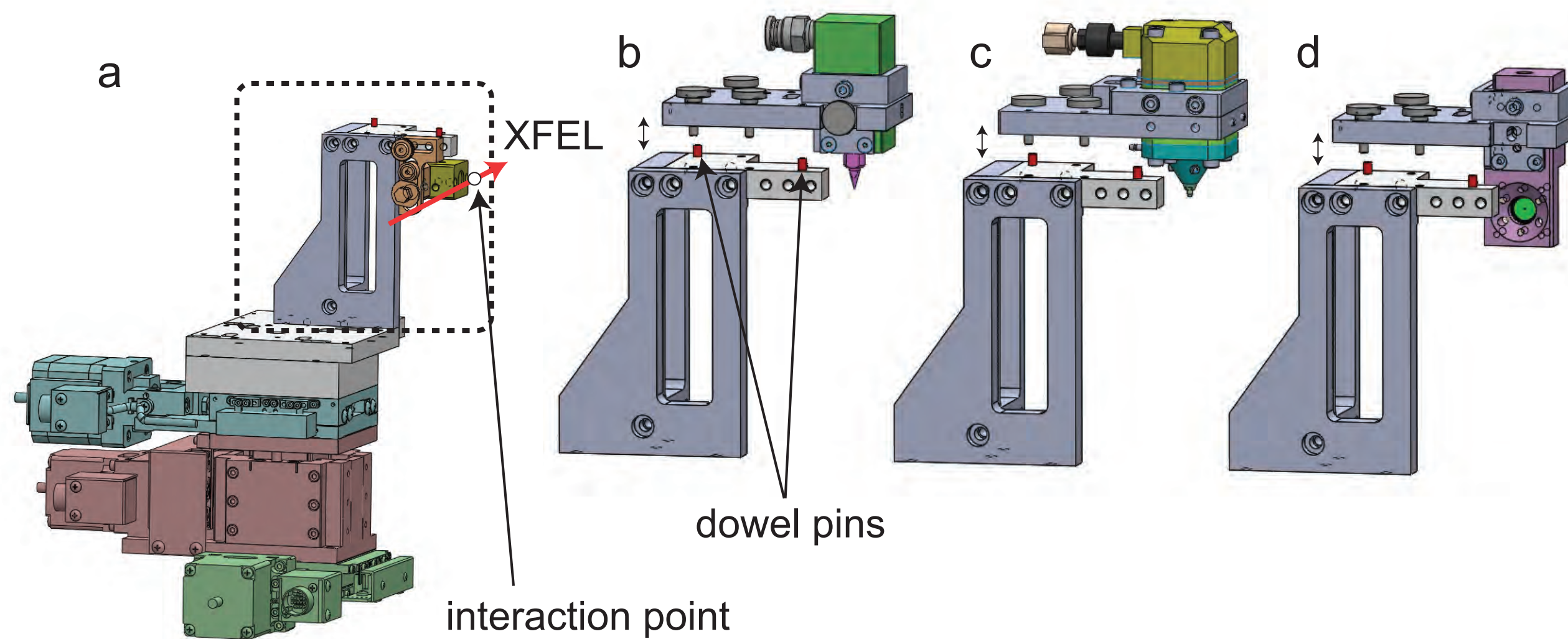


Katayama et al., Struct. Dyn. 6, 054302 (2019).

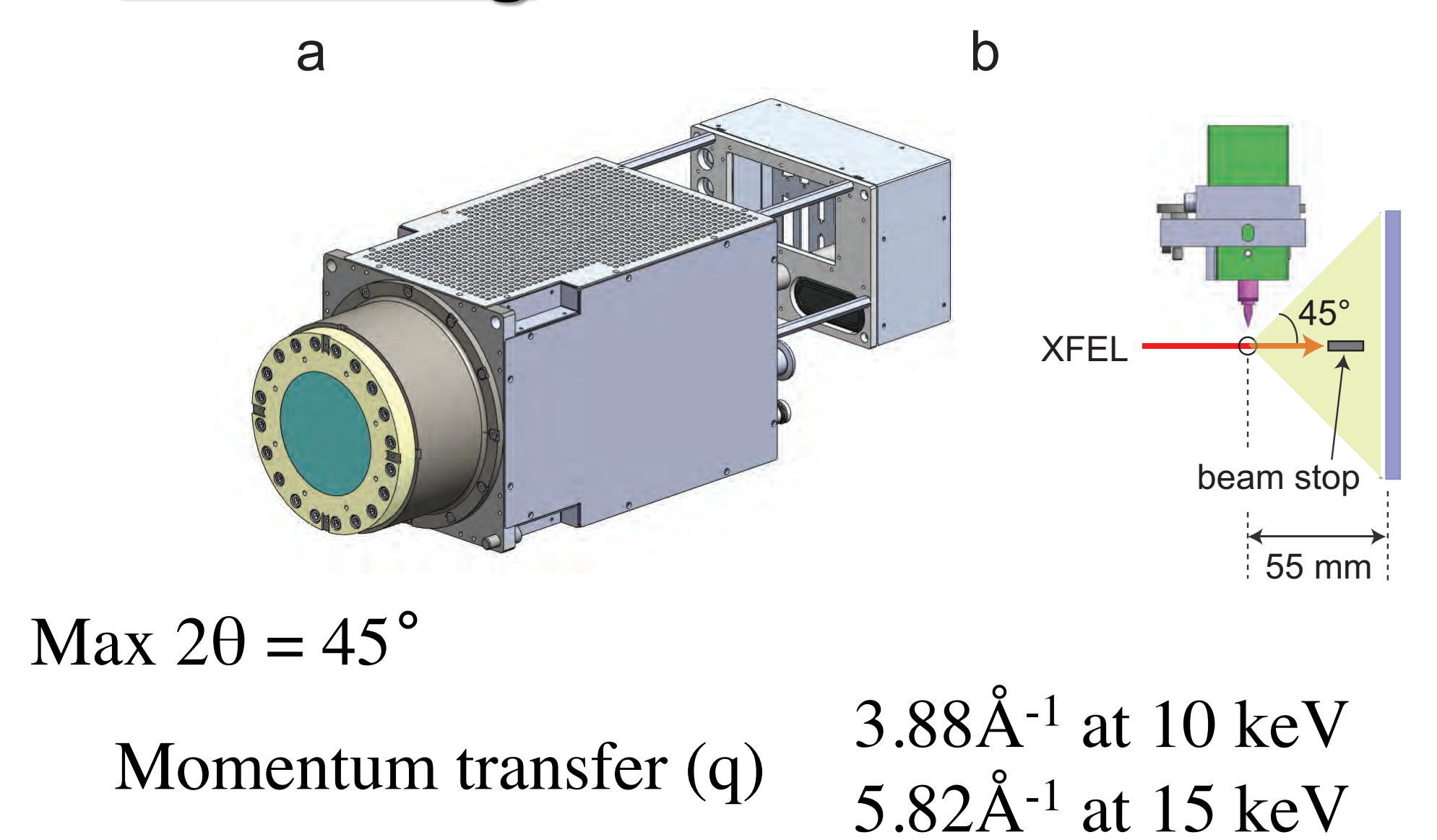
• Injectors

For chemical solution (b),
I.D. = 30–500 μm
For protein microcrystals (c),
I.D. = 50–200 μm

Injectors and pinhole (d) are replaceable.



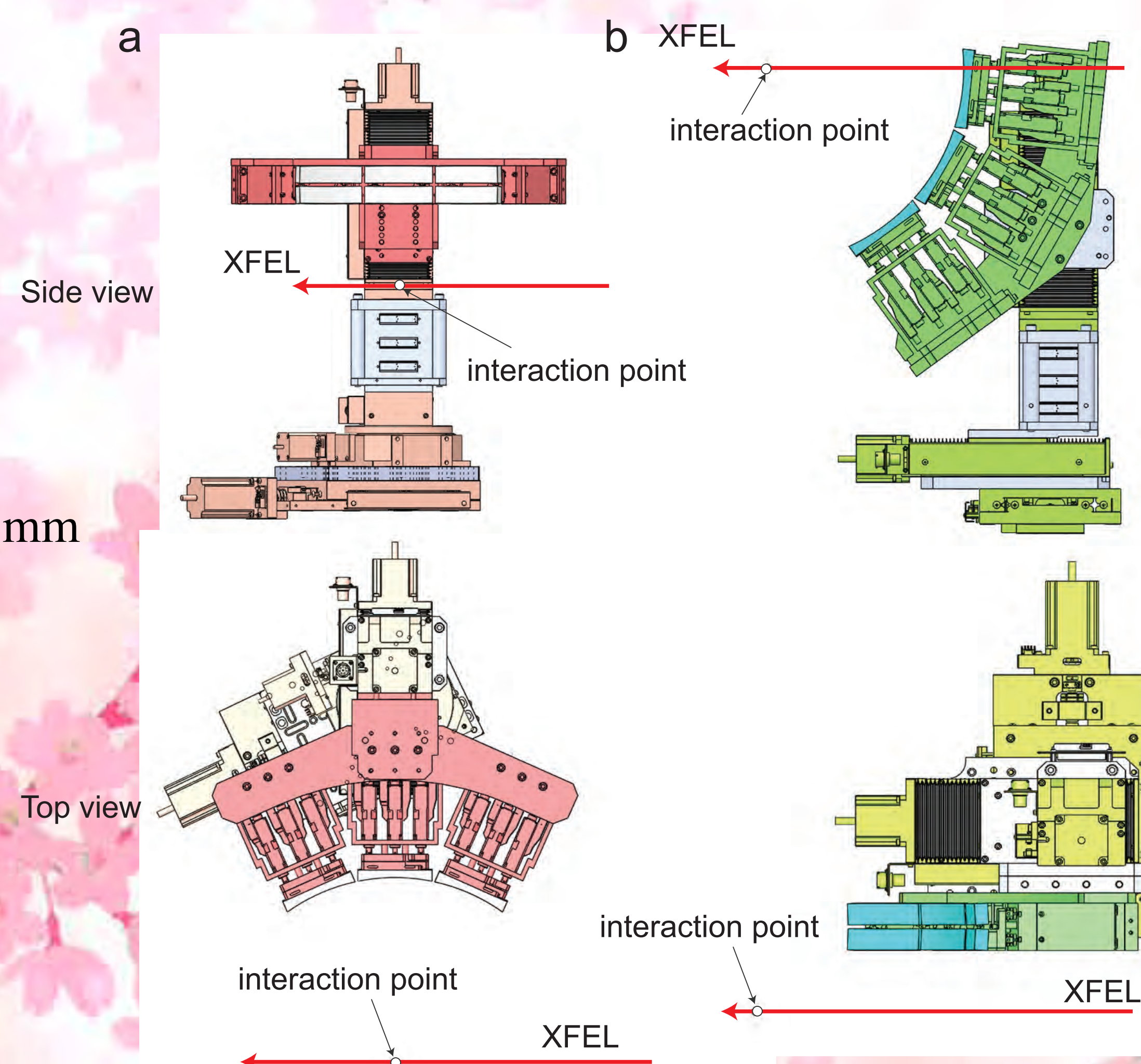
• Scattering



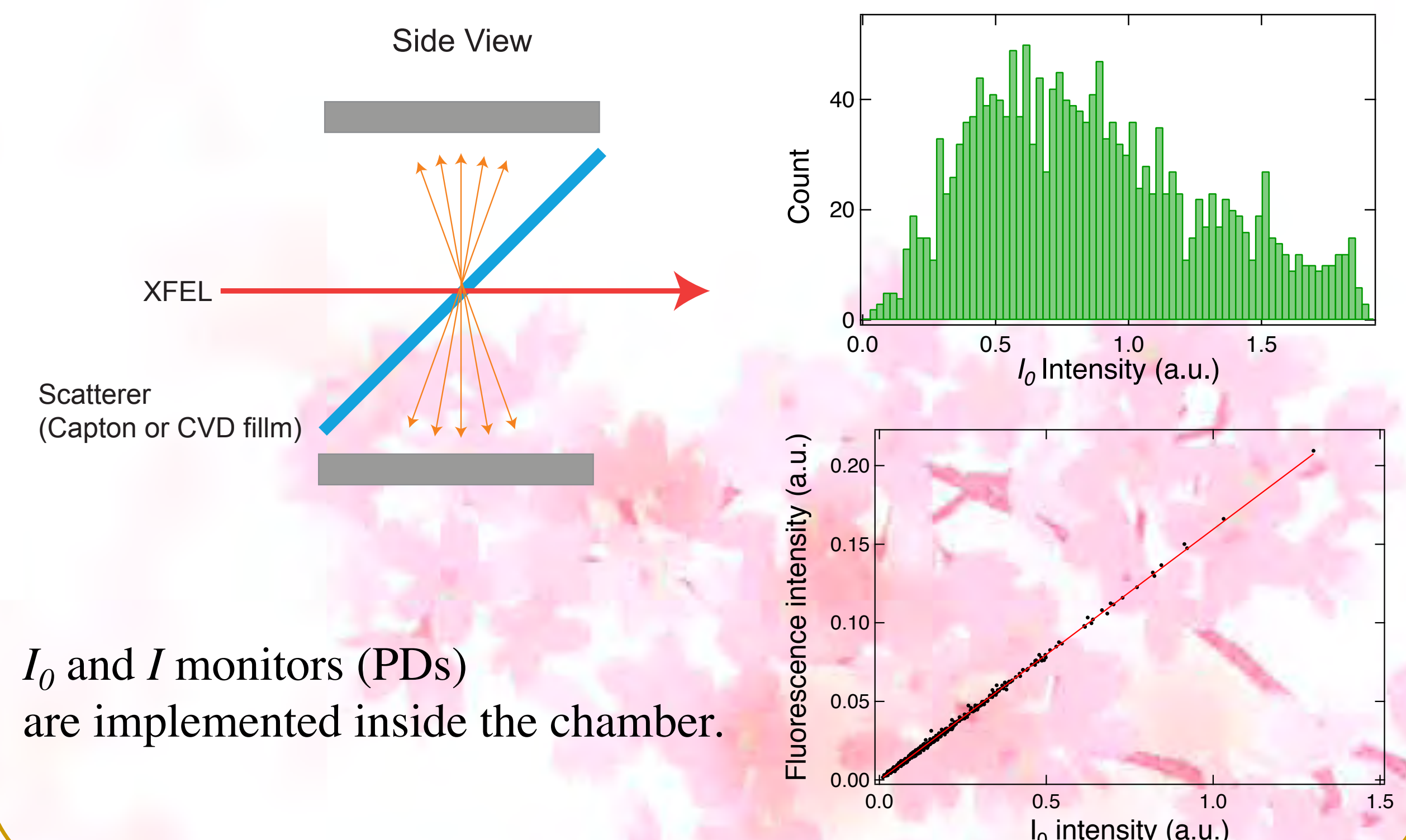
• Von Hamos spectrometers

Parameters

- ROC = 250 mm
- $\theta_B = 65\text{--}75^\circ$
- Crystal size:
100 mm x 25 mm x 0.15 mm
- Six Johann crystals mountable
- Available crystals
Si(531), Si(111),
Ge(111), Ge(110)



• Intensity correlation



I_0 and I monitors (PDs) are implemented inside the chamber.

• Highlight publications

- Katayama et al., Nat. Commun. 10, 3606 (2019).
- Kinschel et al., Nat. Commun. 11, 4145 (2020).
- Uemura et al., Angew. Chem. Int. Ed. 55, 1364-1367 (2016).