Supplementary Information

Characterizing intrinsic property of individual XFEL pulses via single-particle diffractions

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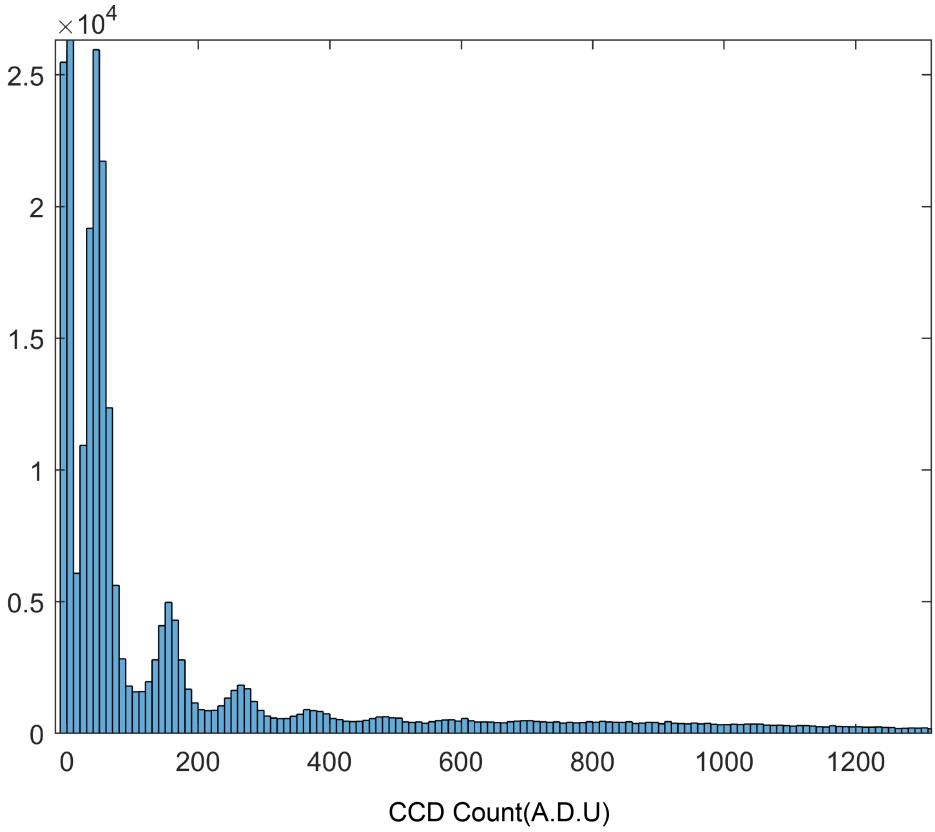
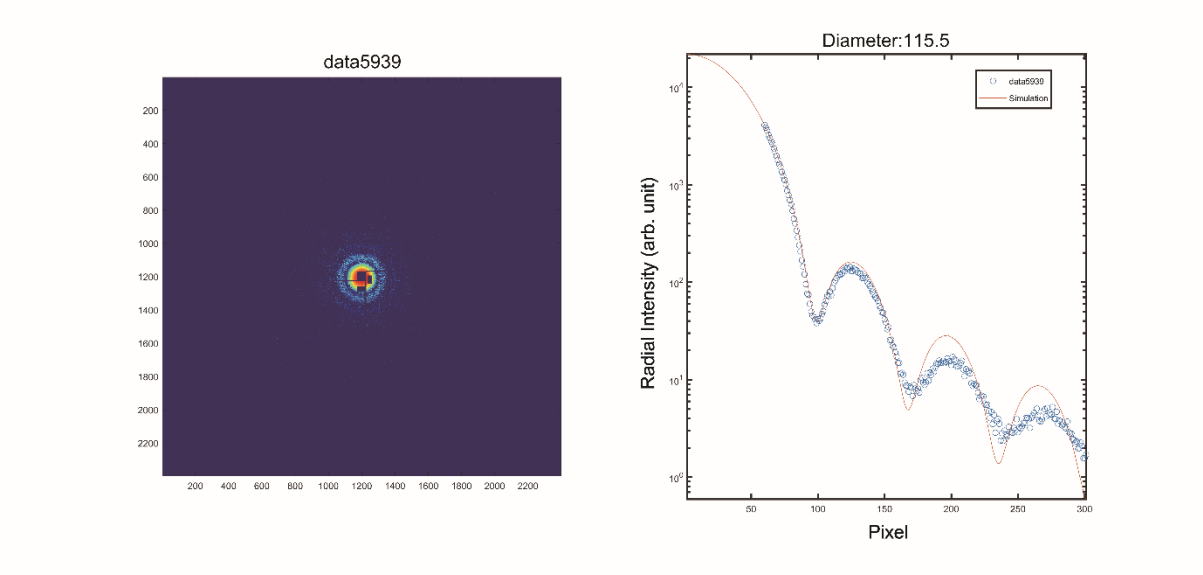
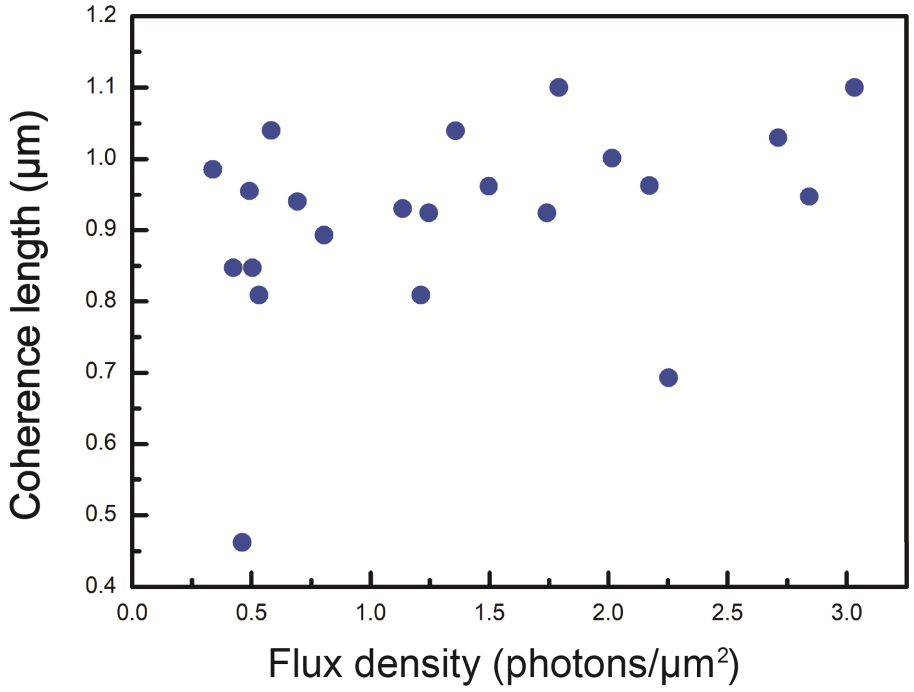


Supplementary Figure 1: The figure above shows the CCD count histogram (binning width 10 count) of data obtained from SACLA. We eliminated pixels whose count is less than 20 counts (~0.2 photons) of signal (Daurer *et al.*, 2017), where one photon is 80 count.



Supplementary Figure 2: The left side is diffraction pattern with weak signal (run#: 5939), whose $I_0(Q=0) = 0.33 \times 10^{10}$ photons/μm^2. On the right side of the figure, the data fluctuation is severe due to the low signal-to-noise ratio, and the radial intensity does not follow the analytic curve unlike Fig. 3.a of main article.



Supplementary Figure 3: The above plot shows the flux density (x-axis) obtained in section 2 and the spatial coherence length (y-axis) obtained in section 3. Both quantity does not show clear correlation.

Reference

Daurer, B. J., Okamoto, K., Bielecki, J., Maia, F. R. N. C., Muhlig, K., Seibert, M. M., Hantke, M. F., Nettelblad, C., Benner, W. H., Svenda, M., Timneanu, N., Ekeberg, T., Loh, N. D., Pietrini, A., Zani, A., Rath, A. D., Westphal, D., Kirian, R. A., Awel, S., Wiedorn, M. O., van der Schot, G., Carlsson, G. H., Hasse, D., Sellberg, J. A., Barty, A., Andreasson, J., Boutet, S., Williams, G., Koglin, J., Andersson, I., Hajdu, J. & Larsson, D. S. D. (2017). *IUCrJ* **4**, 251-262.