

Detector activities at SPring-8/SACLA

Status of NanoTerasu, a new Soft to Tender X-ray synchrotron radiation facility

F. Orsini, on behalf of the SPring-8/SACLA detector group

With materials from K. Horiba for NanoTerasu

Soft X-ray Detectors workshop, Zurich
12-14 January 2026



Detector group activities at SPring-8 / SACLA

Detectors development / research activities	Technique / application	Photon energy range (keV)	Pixel size (μm)	Current Status
CITIUS Charge-integrated DET	Diffraction, imaging, spectroscopy, spectro-imaging, XPCS, etc	1.5 – 20 (30)	72.6	<ul style="list-style-type: none"> ~120 modules deployed on beamlines (several geom.) 840k for ptychography at BL29XU, BL10 at NanoTerasu, QEGS at BL35XU 280k and 20.2M deployed in SACLA in 2025 280k version deployed on EXAFS beamline in 2025 XPCS experiment in February 2026 2.2M for SACLA, single crystal structure analysis at SPring-8 in 2026 5M for high-resolution ptychography at BL21XU in 2026 2.2M SAXS and 2.8M WAXS foreseen in 2027 <p>[T. Hatsui, SRI2024]</p>
sxCMOS CMOS sensor (BSI PD)	Diffraction Imaging	Up to 1	22.4	<ul style="list-style-type: none"> Development ongoing (1k x 1k full chip under test) <p>[H. Shike et al., IEEE Trans. Elec. Dev., vol 68, no 4, 2021]</p>
DIFRAS Lens-coupled imaging DET	Transmission imaging	3-200	< 1 (L&S resolution)	<ul style="list-style-type: none"> Deployed on 10 beamlines at SPring-8/SACLA Supports a maximum 150-Mpixels system Provides a single-edge, SSD direct-record GenICam DAQ system for 100 GigE cameras (up to 100 Gbps) Supports a maximum 2-Tvoxel CT system (2024) Integrated into a high-resolution digital topography system (2025) <p>[T. Kameshima et al., Optics Letters 44, 1403, 2019]</p>
mxdCMOS Multi-el SDD	Spectroscopy	3.8 – 20	1800	<ul style="list-style-type: none"> First prototype delivered to EXAFS beamline; other copies are foreseen in 2026 <p>[T. Kudo et al., submitted to IEEE TNS, Dec 2025]</p>
High-Z detectors Various DET	Diffraction / Scattering	> 50	> 50	<ul style="list-style-type: none"> Several CdTe detectors tested (laboratory / beamlines) CdTe and CZT detectors to be tested in 2026 <p>[F. Orsini et al., J. Synchrotron Rad. 32, 2025]</p>

NanoTerasu Synchrotron Light Source

3 GeV synchrotron radiation facility in Japan

K. Horiba

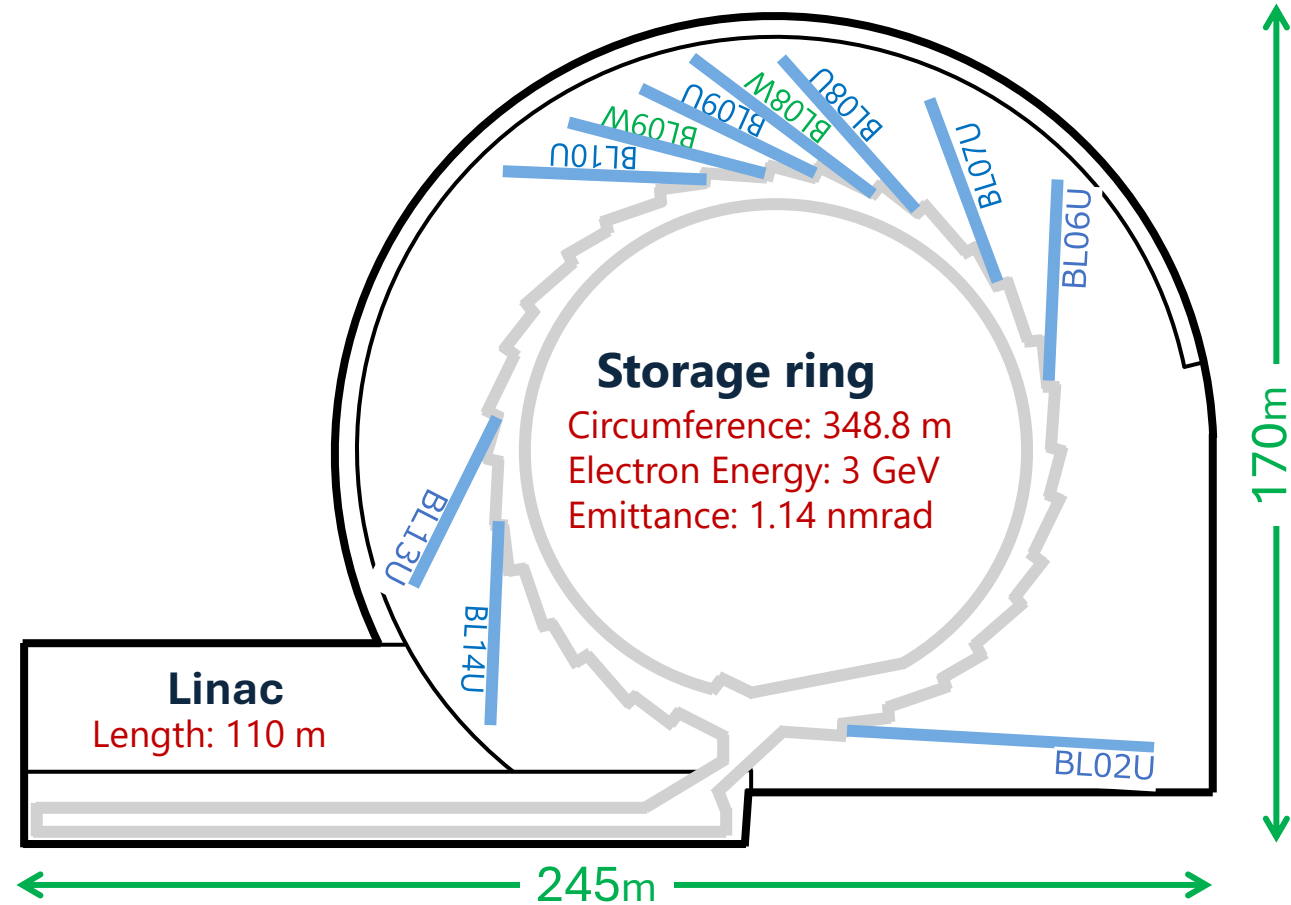
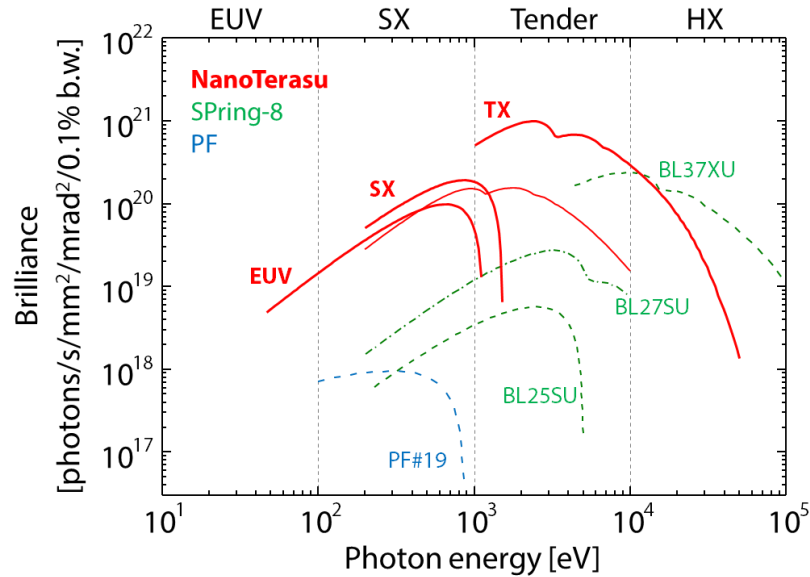




NanoTerasu Synchrotron Light Source

NanoTerasu

Higher brilliance than PF&SPring-8 at soft x-ray or tender x-ray regions



Ref. Photon Factory: 34.6 nrad (187 m), SPring-8: 2.4 nrad (1436 m)



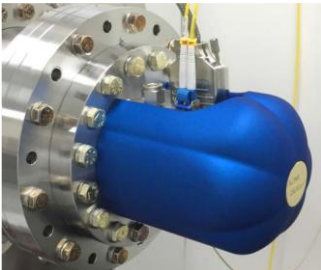
Soft (tender) X-ray detector used on NanoTerasu

NanoTerasu

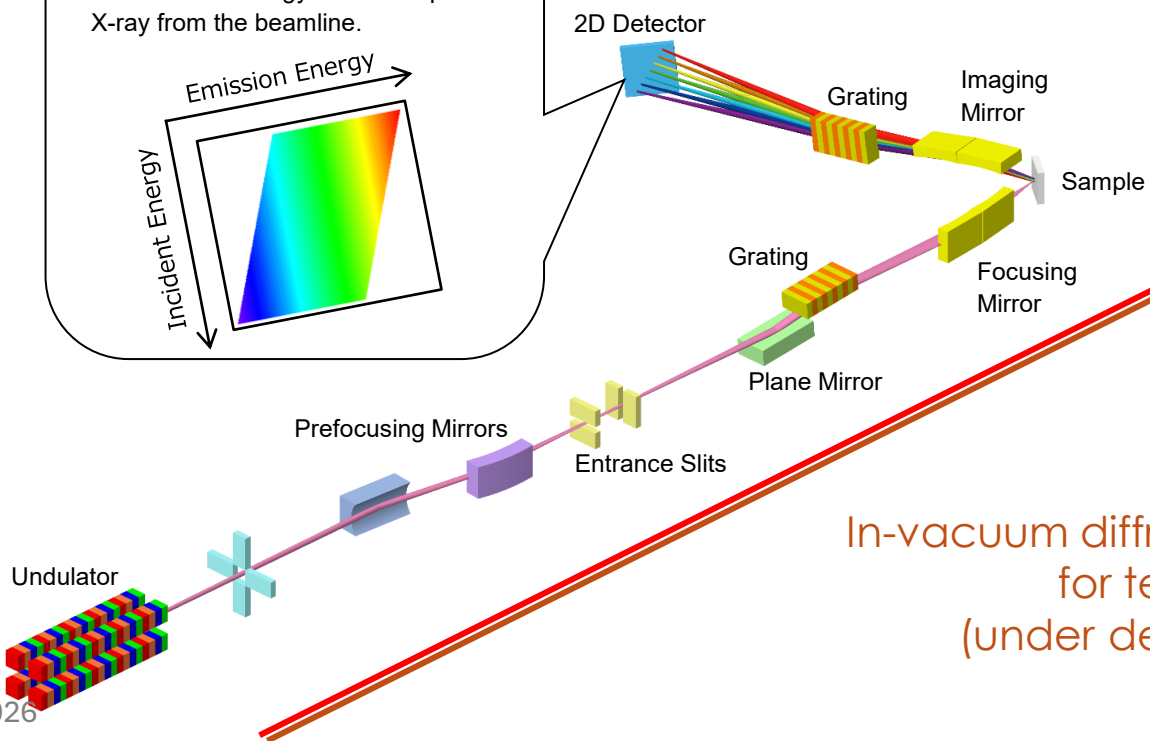
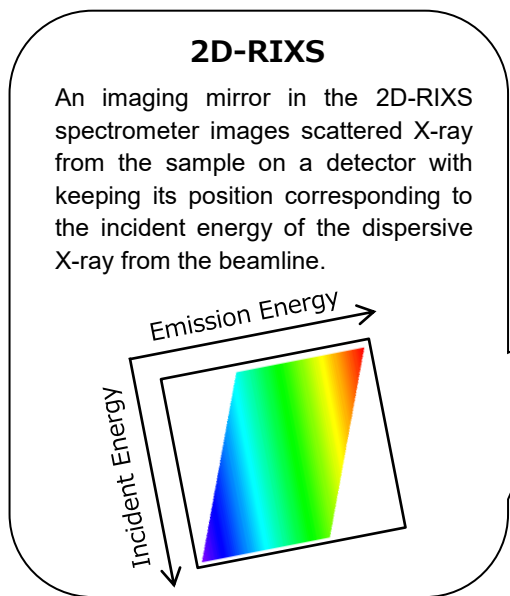
BLO2U:

Ultra-high-resolution RIXS by 2D detection system

Energy range : 250 – 2000 eV

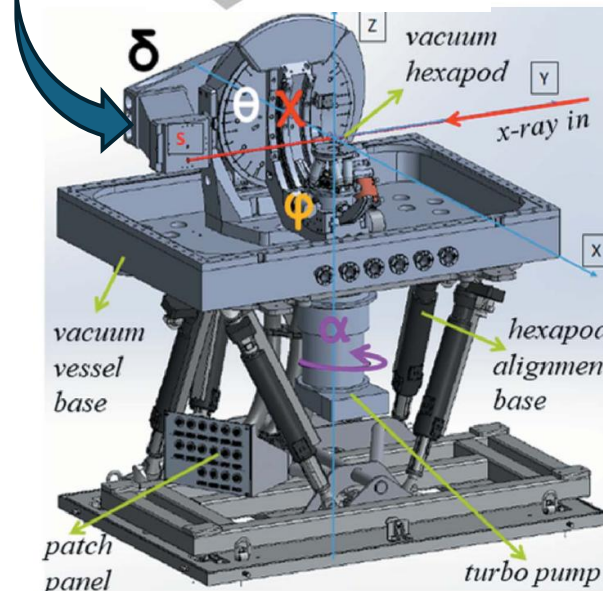
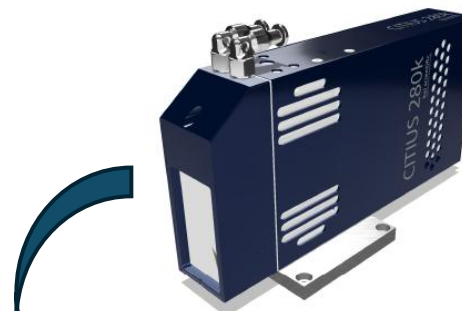


- XCAM RIXSCam mini
- <math>< 5 \mu\text{m}</math> spatial resolution with centroid analysis



Energy range : 2.1 – 20 keV

CITIUS detector (in-vacuum)



BL11W:

In-vacuum diffractometer for tender X-ray (under designing...)

G. Ciatto et al. J. Synchrotron Rad. **26**, 1374 (2019).