Coherent Soft X-ray (CSX) high coherent flux and full polarization control beamline

Scientific scope

The CSX beamline design (source and optics) has been optimized to the NSLS-II parameters to provide the highest possible flux for experiments requiring either high coherence or full control of the polarization.

Beamline description

The CSX beamline will be served by two identical EPU49 sources. Both EPUs are planned to operate in a canted geometry with opposite circular polarization for fast polarization switching experiments at the full polarization control (PC) branch. The EPUs will also be able to operate "phased" as a single device for high coherent flux experiments at the high coherent flux (HCF) branch. A third operation mode is planned where both branches are served simultaneously by one EPU.

Techniques

- Coherent x-ray scattering / x-ray diffraction microscopy
- Polarization dependent spectroscopy / scattering
- Ultrafast dynamics
- X-ray photon correlation spectroscopy

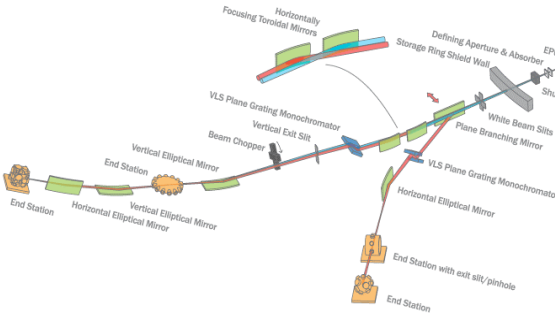
Beamline Performance

Source type	Dual - EPU49
Energy range (eV) Wavelength range (nm)	270 – 2000 4.6 - 0.6
Energy resolution @ 0.5keV (HCF) Energy resolution @ 0.5keV (PC)	$E/\Delta E = 1.5 \times 10^3$ $E/\Delta E = 1.0 \times 10^4$
Beam size at sample (HCF) v x h (µm x µm) Beam size at sample (PC) v x h (µm x µm)	20 x 20 10 x 50 / 5 x 5**
Coherent flux @ 0.5 keV (HCF) Flux @ 0.5 keV (PC) (ph/s/0.1% bw)	2.0×10^{13} 2.0×10^{13}

Equipment in End Stations

HCF experimental end station under commissioning
PC experimental end station under construction

Sample environments	**HCF**	**PC**
He cryostat	10 – 300 K	20 – 300 K
Magnetic field		1 Tesla (xyz)
Vacuum	10^{-9} Torr	10^{-8} Torr
Detectors		
APD	Planned	available
Area detector	CCD (planned)	planned
Channeltron	available	available
Photodiode	available	available



CSX beamline schematic layout

Conceptual Design Report
Preliminary Design Report (to be published)

Current status:	preliminary design (to be published)
Construction on the floor:	date pending
Commissioning with beam:	date pending
General user operation:	begins June 2015

Signing of agreement between NSLS-II Project Directo Steve Dierker and the Beamline Advisory Team, Janua 8, 2009. From left: (front row) Qun Shen, Steve Dierke Cecilia Sánchez-Hanke (CSX group leader), and Steve Hulbert (BAT); (back row) Andy Broadbent, Ruben Reininger, John Hill, Dario Arena (BAT), Stuart Wilki (BAT), and Paul Steadman (Diamond, visitor).

Contact

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Beamline Personnel

D. Shapiro	Beamline scientist
D. Bacescu	Beamline mechanical engineer
C. Stelmach	Beamline mechanical designer
C. Sánchez-Hanke	Group leader/beamline scientist

Collaborators

R. Reininger	Beamline and optics
S. Hulbert	Beamline and optics
O. Chubar	Source (EPU-49)
T. Tanabe	Source (EPU-49)
C. Kitegi	Source (EPU-49)
V. Ravindranath	FEA analysis
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A. Hussain	X-ray tracing
A. DeSantis	FOE hutch design
M. Johanson	Controls design
D. Chabot	Controls