

FACILITY FACTS & FIGURES

The National Synchrotron Light Source (NSLS) is a national user research facility funded by the U.S. Department of Energy's Office of Basic Energy Science. The NSLS operates two electron storage rings: an x-ray ring (2.8 GeV, 300 mA) and a vacuum ultraviolet (VUV) ring (800 meV, 1.0 A), which provide intense light spanning the electromagnetic spectrum from the infrared through x-rays. The properties of this light, and the specially designed experimental stations, called beamlines, allow scientists in many fields of research to perform experiments not otherwise possible at their own laboratories.

Over 2,100 scientists representing almost 400 institutions, 47 of them corporations, come to Brookhaven National Laboratory annually to conduct research at the NSLS. The facility operates seven days a week, 24 hours a day throughout the year, except during periods of maintenance and studies.

As a national user facility, the NSLS does not charge for its beamtime, provided that the research results are published in the open literature. Proprietary research is conducted on a full cost recovery basis. The primary way to obtain beamtime at the NSLS is through the General User program. General Users are independent investigators interested in using the NSLS for their research. Access is gained through a peer-reviewed proposal system.

The NSLS currently has 51 x-ray and 14 VUV-IR operational beamlines available to users for performing a wide range of experiments. There are two types of beamlines at the NSLS: Facility Beamlines (FBs) and Participating Research Team (PRT) beamlines. In 2006, the NSLS had 18 FBs and 47 PRT beamlines. FBs are operated by the NSLS and reserve at least 50% of their beamtime for General Users. Some FBs host contributing users (CUs), who enhance the endstation capabilities and provide specialized user support. PRT beamlines are operated by user groups with related interests from one or more institutions. PRT beamlines reserve 25% of their beamtime for General Users. Membership in a PRT or CU program is open to all members of the scientific community who can contribute significantly to the program of the beamline, (i.e., funding, contribution of equipment, scientific program, design and engineering, operations manpower, etc).

The following pages list the operational beamlines at the NSLS and their unique characteristics.

BEAMLINE GUIDE ABBREVIATIONS

ARPES UV PHOTOELECTRON SPECTROSCOPY, ANGLE-RESOLVED	IRMS INFRARED MICROSPECTROSCOPY	UPS UV PHOTOELECTRON SPECTROSCOPY
DAFS X-RAY DIFFRACTION ANOMALOUS FINE STRUCTURE	MAD MULTI-WAVELENGTH ANOMOLOUS DISPER- SION	UV-CD ULTRAVIOLET CIRCULAR DICHROISM
DEI DIFFRACTION-ENHANCED IMAGING	MCD MAGNETIC CIRCULAR DICHROISM	WAXD WIDE-ANGLE X-RAY DIFFRACTION
EXAFS X-RAY ABSORPTION SPECTROSCOPY, EXTENDED FINE STRUCTURE	NEXAFS NEAR EDGE X-RAY ABSORPTION SPECTROSCOPY	WAXS WIDE-ANGLE X-RAY SCATTERING
GISAXS GRAZING INCIDENCE SMALL ANGLE X-RAY SCATTERING	PEEM PHOTO EMISSION ELECTRON MICROSCOPY	XAS X-RAY ABSORPTION SPECTROSCOPY
HARMST HIGH ASPECT RATIO MICROSYSTEMS TECHNOLOGY	SAXS SMALL ANGLE X-RAY SCATTERING	XPS X-RAY PHOTOELECTRON SPECTROSCOPY
	STXM SCANNING TRANSMISSION X-RAY MICROSCOPY	XRD X-RAY DIFFRACTION
		XSW X-RAY DIFFRACTION, STANDING WAVES

VUV-IR BEAMLINES

Beamline	Source	Technique	Energy Range	Type	Organization
U1A	Bend	XAS EXAFS NEXAFS	270-900 eV	PRT	ExxonMobil Research and Engineering Co.
U2A	Bend	IRMS High Pressure Research IR spectroscopy	30-8000 cm ⁻¹	FB	BNL-NSLS Carnegie Institution of Washington COMPRES
U2B	Bend	IRMS IR spectroscopy	50-4000 cm ⁻¹	PRT	Case Western Reserve University
U3C	Bend	Metrology	50-1000 eV	PRT	Bechtel Nevada Lawrence Livermore National Laboratory Los Alamos National Laboratory Sandia National Laboratory
U4A	Bend	UPS	10-250 eV	PRT	Army Research Laboratory North Carolina State University Rutgers University University of North Carolina
U4B	Bend	X-ray scattering, resonant MCD UPS X-ray fluorescence spectroscopy XPS	20-1200 eV	PRT	Montana State University Northeastern University
U5UA	Insertion Device	ARPES UPS, spin-resolved PEEM	15-150 eV	FB	BNL-CFN
U7A	Bend	NEXAFS XPS	180-1200 eV	PRT	BNL-Chemistry Dow Chemical Company NIST University of Michigan
U9B	Bend	UV-CD UV fluorescence spectroscopy	0.8 - 8.0 eV	PRT	BNL-Biology
U10B	Bend	IRMS	500-4000 cm ⁻¹	FB	BNL-NSLS
U11	Bend	UV-CD	3-10 eV	PRT	BNL-Biology
U12A	Bend	XAS XPS	100-800 eV	PRT	Oak Ridge National Laboratory
U12IR	Bend	IR spectroscopy THz / mm wave spectroscopy Time-resolved spectroscopy	6-600 cm ⁻¹	FB	BNL-NSLS

Beamline	Source	Technique	Energy Range	Type	Organization
U13UB	Insertion Device	UPS ARPES	3-30 eV	PRT	Boston College Boston University BNL-Physics Columbia University

X-RAY BEAMLINES

X1A1	Insertion Device	STXM	0.25-0.50 keV	PRT	BNL-Environmental Science ExxonMobil Research and Engineering Co. SUNY @ Plattsburgh Stony Brook University University of Texas @ Houston
X1A2	Insertion Device	STXM	0.25-1 keV	PRT	Stony Brook University
X1B	Insertion Device	X-ray scattering, coherent XAS X-ray fluorescence spectroscopy XPS	0.2-1.6 keV	PRT	Boston University Thomas Jefferson National Accelerator Facility University of Illinois
X2B	Bend	X-ray microtomography	8-35 keV	PRT	ExxonMobil Research and Engineering Co.
X3A	Bend	MAD Macromolecular crystallography	5-15 keV	PRT	Albert Einstein College of Medicine Case Western Reserve University Rockefeller University Sloan-Kettering Institute
X3B	Bend	XAS EXAFS	5-15 keV	PRT	Case Western Reserve University
X4A	Bend	MAD Macromolecular crystallography	3.5-20 keV	PRT	Albert Einstein College of Medicine City University of New York (CUNY) Columbia University Cornell University Mount Sinai School of Medicine New York Structural Biology Center New York University SUNY @ Buffalo Sloan-Kettering Institute Wadsworth Center
X4C	Bend	MAD Macromolecular crystallography	7-20 keV	PRT	Albert Einstein College of Medicine City University of New York (CUNY) Columbia University Cornell University Mount Sinai School of Medicine New York Structural Biology Center New York University Rockefeller University SUNY @ Buffalo Sloan-Kettering Institute Wadsworth Center

Beamline	Source	Technique	Energy Range	Type	Organization
X5A	Bend	Laser backscattering	150-420 MeV	PRT	BNL-Physics Forschungszentrum Juelich (KFA) James Madison University Norfolk State University Ohio University University of Rome II University of South Carolina University of Virginia Virginia Polytechnic Inst. and State University
X6A	Bend	MAD Macromolecular crystallography	6.0-23 keV	FB	BNL-NSLS
X6B	Bend	XRD, surface WAXD X-ray reflectivity SAXS GISAXS	6.5-19 keV	FB	BNL-CFN BNL-NSLS
X7B	Bend	XRD, single crystal XRD, time resolved WAXD WAXS	5-21 keV	PRT	BNL-Chemistry General Electric
X8A	Bend	Metrology	1.0-5.9 keV	PRT	Bechtel Nevada Lawrence Livermore National Laboratory Los Alamos National Laboratory Sandia National Laboratory
X8C	Bend	MAD Macromolecular crystallography	5-19 keV	PRT	Biogen Incorporated Biotechnology Research Institute Hoffmann-La Roche National Institutes of Health
X10A	Bend	XRD, powder WAXD SAXS WAXS	8-11 keV	PRT	ExxonMobil Research and Engineering Co.
X10B	Bend	XRD, powder XRD, surface WAXD X-ray reflectivity X-ray scattering, surface WAXS	14 keV	PRT	ExxonMobil Research and Engineering Co.
X10C	Bend	XAS EXAFS NEXAFS	4-24 keV	PRT	ExxonMobil Research and Engineering Co.
X11A	Bend	DAFS XAS EXAFS NEXAFS	4.5-35 keV	PRT	BNL-Material Science BNL-Environmental Science Canadian Light Source ETH Labs - Zuerich Natural Resources Canada Naval Research Laboratory (NRL) Naval Surface Warfare Center New Jersey Institute of Technology North Carolina State University Stony Brook University Sarah Lawrence College

Beamline	Source	Technique	Energy Range	Type	Organization
X11B	Bend	XAS EXAFS NEXAFS	5.0-23 keV	PRT	BNL-Environmental Science BNL-Material Science Canadian Light Source ETH Labs - Zuerich Natural Resources Canada Naval Research Laboratory (NRL) Naval Surface Warfare Center New Jersey Institute of Technology North Carolina State University Stony Brook University Sarah Lawrence College
X12B	Bend	MAD Macromolecular crystallography	5-20 keV	PRT	BNL-Biology
X12C	Bend	MAD Macromolecular crystallography	5.5-20.0 keV	PRT	BNL-Biology
X13A	Insertion Device	X-ray scattering, resonant MCD	0.2-1.6 keV	FB	BNL-NSLS
X13B	Insertion Device	Microdiffraction Imaging	4-16 KeV	FB	BNL-NSLS BNL-CFN Columbia University IBM
X14A	Bend	MAD XRD, powder XRD, single crystal XRD, time resolved WAXD X-ray reflectivity	5-26 keV	PRT	Oak Ridge National Laboratory Tennessee Technological University University of Tennessee
X15A	Bend	XSW DEI	3-25 keV XSW 10-60 keV DEI	FB	BNL-NSLS Northwestern University
X15B	Bend	XAS EXAFS NEXAFS	0.8-15 keV	PRT	BNL-Environmental Science Lucent Technologies, Inc. Stony Brook University Temple University University of Texas @ Austin
X16C	Bend	XRD, powder	4.5-25 keV	PRT	Stony Brook University
X17B1	Insertion Device	XRD, powder	55-80 keV mono 20-150 keV white	FB	BNL-NSLS Rutgers University
X17B2	Insertion Device	XRD, powder XRD, time resolved High pressure research	20-130 keV	FB	BNL-NSLS COMPRES Stony Brook University
X17B3	Insertion Device	XRD, powder XRD, single crystal High pressure research	5-80 keV	FB	BNL-NSLS COMPRES University of Chicago

Beamline	Source	Technique	Energy Range	Type	Organization
X17C	Insertion Device	XRD, powder XRD, single crystal High pressure research	5-80 keV	FB	COMPRES University of Chicago
X18A	Bend	XRD, powder XRD, single crystal XRD, surface WAXD X-ray reflectivity X-ray scattering, surface WAXS	4-19 keV	PRT	BNL-Chemistry Indiana University @ Bloomington Pennsylvania State University Purdue University Stony Brook University University of Missouri @ Columbia
X18B	Bend	XAS EXAFS NEXAFS	4.8-40 keV	FB	BNL-Chemistry BNL-Electrochemistry BNL-NSLS ORNL University of Delaware UOP LLC Yeshiva University
X19A	Bend	X-ray scattering, resonant XAS EXAFS NEXAFS	2.1-17 keV	FB	BNL-Chemistry BNL-Electrochemistry BNL-NSLS ORNL University of Delaware UOP LLC Yeshiva University
X19C	Bend	XRD, surface X-ray topography X-ray reflectivity X-ray scattering, liquid X-ray scattering, surface	6-17 keV	PRT	Arizona State University Fairfield Crystal Technology, LLC Kansas State University Kyushu University SUNY @ Albany Stony Brook University University of Illinois @ Chicago
X20A	Bend	XRD, single crystal Microdiffraction Imaging X-ray reflectivity X-ray scattering, surface	4.5-13 keV	PRT	IBM Research Division
X20C	Bend	XRD, single crystal XRD, surface XRD, time resolved X-ray reflectivity X-ray scattering, surface	4-11 keV	PRT	IBM Research Division
X21	Insertion Device	XRD, single crystal XRD, surface X-ray scattering, magnetic X-ray scattering, resonant X-ray scattering, surface SAXS	5-15 keV	FB	BNL-NSLS Boston University University of Vermont
X22A	Bend	XRD, single crystal XRD, surface WAXD X-ray reflectivity X-ray scattering, surface WAXS	10.7 keV 32 keV	PRT	BNL-CMPMSD BNL-Chemistry

Beamline	Source	Technique	Energy Range	Type	Organization
X22B	Bend	X-ray scattering, liquid X-ray scattering, surface	6.5-10 keV	PRT	Bar-Ilan University BNL-CMPMSD BNL-CFN Harvard University
X22C	Bend	XRD, single crystal XRD, surface X-ray reflectivity X-ray scattering, magnetic X-ray scattering, surface	3-12 keV	PRT	BNL-CMPMSD Massachusetts Institute of Technology Rutgers University
X23A2	Bend	XRD, powder DAFS XAS EXAFS NEXAFS	4.7-30 keV	PRT	NIST
X23B	Bend	XRD, powder XAS EXAFS NEXAFS	4-10.5 keV	PRT	Hunter College Montana State University Naval Research Laboratory (NRL) New Jersey Institute of Technology Sarah Lawrence College
X24A	Bend	XSW Auger spectroscopy EXAFS X-ray fluorescence spectroscopy XPS	1.8-5 keV	PRT	NIST
X24C	Bend	X-ray reflectivity UV photoabsorption spectroscopy UPS XAS	0.006-1.8 keV	PRT	Naval Research Laboratory (NRL) Universities Space Research Association
X25	Insertion Device	MAD Macromolecular crystallography	3-28 keV	FB	BNL-Biology BNL-NSLS
X26A	Bend	Microdiffraction Imaging X-ray microprobe	3-30 keV	PRT	BNL-Environmental Science University of Chicago University of Georgia
X26C	Bend	MAD Macromolecular crystallography	5-20 keV	PRT	BNL-Biology Cold Spring Harbor Laboratory Stony Brook University
X27A	Bend	X-ray microprobe	4.5-20 keV	FB	BNL-Environmental Science BNL-NSLS Stony Brook University
X27B	Bend	HARMST	8-40 keV	PRT	BNL-Nonproliferation & National Security
X27C	Bend	XRD, time resolved WAXD SAXS WAXS	9 KeV	PRT	Air Force Research Laboratory Dow Chemical Company National Institutes of Health Naval Surface Warfare Center Stony Brook University

Beamline	Source	Technique	Energy Range	Type	Organization
X28C	Bend	X-ray footprinting	White Beam	PRT	Case Western Reserve University
X29A	Insertion Device	MAD Macromolecular crystallography	6-15keV	PRT	BNL-Biology Case Western Reserve University