- NUFO represents the interests of all who conduct research at U.S. national scientific User Facilities.
- 45,000 scientists working at the 46 largest federally funded user facilities in the U.S. (6 BNL facilities).
- Users of all (nearly) the U.S. LightSource facilities are members:
  - Advanced Light Source (ALS)
  - Advanced Photon Source (APS)
  - Center for Advanced Microstructures and Devices (CAMD)
  - Cornell High Energy Synchrotron Source (CHESS)
  - Linac Coherent Light Source (LCLS)
  - National Synchrotron Light Source (NSLS)
  - Stanford Synchrotron Radiation Lightsource (SSRL)

- Educate and Advocate regarding the benefits and significance of research conducted at user facilities and their operational needs.
- Facilitate communication among users, user representatives, facility administrators and stakeholders.
- Provide a unified message at the national level on issues of resources for science, economic competitiveness and education for the next-generation scientific workforce.

• The NSLS/NSLS-II Transition will impact the **DOE** LightSource User Community
• Availability of resources **WILL** change.
• Our hope was to provide information to DOE LightSource User Community to help plan their research programs over next 5 year.

Goals:

•Evaluate likely beamline availability (capacity) nationally over this time frame.
• Evaluate short and long term changes in availability by technique.
• On your behalf, provide feedback to BES on resource needs now and in the future.

Benchmarking changes in beamline availability from 2012-2016

Experimental techniques at Light-Source Beamlines
http://science.energy.gov/~/media/bes/pdf/Synchrotron_Techniques.pdf

- Divides techniques into 3 broad categories
- 12 basic techniques

SPECTROSCOPY	SCATTERING	IMAGING
01 Low-Energy spectroscopy	05 Hard X-ray diffraction	09 Hard X-ray Imaging
02 Soft X-ray spectroscopy	06 Macromolecular X'tal	10 Soft X-ray Imaging
03 Hard X-ray spectroscopy	07 Hard X-ray scattering	11 Infrared Imaging
04 Optics/Calibration/Metrology	08 Soft X-ray scattering	12 Lithography

Worked with peers across the complex -

- Produce a set of spreadsheets showing likely beamline availability by technique at the 4 DOE synchrotron LS facilities in 2012, 2014 and 2016.
- Goal – see what is available where through the transition
- For each technique we asked beamline scientists from a representative beamline to interface with their counterparts nationally to assemble benchmark values.
- These were then distributed to management at all four facilities for comment to ensure estimates are reasonable.
- These will be distributed to the user community and should provide guidance on what specific beamlines will be available to you in planning your research needs.

Caveats

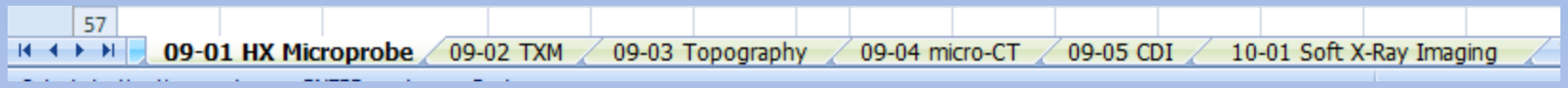
- These are estimates!
- Differences from what is projected are virtually guaranteed due to uncertainties in future funding.
- How individual facilities and beamlines define beamtime availability and techniques is highly variable.
- Usage statistics and categorization for beamlines is a best guess.
- General User vs. Stakeholder time fractions is not considered.
- Again, the goal is here is to provide users reasonable guidance…

Techniques through the Transition

Number	Technique
01-01	Infrared
01-02	Photoemission
02-01	Soft X-ray Spectroscopy
02-02	Tender XAS
03-01	EXAFS
04-01	Metrology
05-01	X-Ray Powder Diffraction
05-02	Extreme Conditions
05-03	Energy Dispersive
05-04	Micro-Beam Diffraction
06-01	Macromolecular Crystallography
06-02	X-ray footprinting
07-01	SAXS/WAXS/GISAXS/Liq Surface
07-02	Resonant & High Magnetic-Field Scattering
07-03	General Diffraction
07-04	In-Situ Scattering
07-05	XPCS
07-06	Solution, BioSAXS
07-07	Hard IXS
08-01	Soft X-ray Scattering
08-02	Pump/Probe
08-03	Soft IXS
09-01	HX Microprobe
09-02	TXM
09-03	Topography
09-04	micro-CT
09-05	Coherent Diffraction Imaging
10-01	Soft X-ray Microprobe

- Collected a total of 28 subcategories
- Beamline Equivalents (BE) by facility

Technique	Photoemission	Resources Available - BE			
		Mid 2012	Mid 2014	Mid 2016	Mid 2017
Beamline	X-ray Source	Total	Total	Total	Total
NSLS		2.5	2.5	0	0
U5UA	undulator	**1**	**1**	0	0
U13	undulator	**1**	**1**	0	0
X1A1*	undulator	0.5	0.5	0	0
APS		0.3	0.3	0.3	0.3
4 ID C	undulator	**0.3**	**0.3**	**0.3**	**0.3**
ALS		4	4	4	4
7.0.1	U5 - undulator	**0**	0	0	0
10.0.1	U10 - undulator	**1**	1	1	1
12.0.1	U8 - undulator	**1**	1	1	1
11.0.1.1*	EPU5 - undulator	**1**	1	1	1
9.3.2**	bend	**1**	1	1	1
SSRL		1	1	1	1
BL5-4	undulator	**1**	**1**	**1**	**1**
NSLS-II		0	0	0	1
ESM	EPU - undulator	0	0	0	1
Totals		**7.8**	**7.8**	**5.3**	**6.3**



2	HX Microprobe		Resources Available - BE		
3			Mid 2012	Mid 2014	Mid 2016
4	Beamline	X-ray Source	Total	Total	Total
5	NSLS-I		2	2	0
8	APS		3.4	4.8	4.8
19	ALS		1.2	0	0
22	SSRL		1	1	2
25	NSLS-II		0	0	3
30	Total		7.6	7.8	9.8

HX Microprobe		Resources Available - BE		
		Mid 2012	Mid 2014	Mid 2016
Beamline	X-ray Source	Total	Total	Total
NSLS-I		2	2	0
X26A	Bend	**1**	**1**	0
X27A	Bend	**1**	**1**	0
APS		3.4	4.8	4.8
2-ID-D	Undulator	**0.5**	**0.5**	**0.5**
2-ID-E	Undulator	**1**	**1**	**1**
8-BM-B	Bend	0.5	**1**	**1**
10-ID-B	Undulator	*0*	*0*	
13-ID-E	Undulator	**0.3**	**1**	**1**
18-ID-D	Undulator	*0.1*	*0.1*	*0.1*
20-ID-B[a]	Undulator	**0.5**	**0.5**	**0.5**
20-BM-B[a]	Bend	**0.2**	**0.2**	**0.2**
21-ID-D[g]	Undulator	0	0.2	0.2
26-ID-C[f]	Undulator	**0.3**	**0.3**	**0.3**
ALS		1.2	0	0
10.3.1	Bend	**0.2**	0	0
10.3.2[b]	Bend	**1**	0	0
SSRL		1	1	2
BL2-3	Bend	**1**	**1**	**1**
BL2-2[e]	Bend	0	0	1
NSLS-II		0	0	3
SRX[c]	Undulator	0	0	1
HXN[c]	Undulator	0	0	1
XFM[d]	3P Wiggler	0	0	1
Total		7.6	7.8	9.8

not open to general users because of staffing

CCD available for micro-diffraction

NxtGen

XRF only

XRF, XAFS

XRF, XAFS, XRD or XRF, XRD, FCMT

XRF, XAFS, XRD, FCMT

BE - Beamline equivalent - 1 BE is a station running the full operating schedule of the facility. Typically 5000 Hrs/yr

Boldface = oversubscribed

Footnotes:

a = Fraction of microprobe experiments somewhat flexible; might accommodate more if more proposals received.

b = Assumes termination of 10.3.2 microprobe studies

c = Commissioning in 2014

d= Approved but unfunded

e= Proposed retrofitting of current white light beamline

f = Additional time available through Center for Nanoscale Materials

g = Additional time available for TXM and tunneling probe

Information compiled by:

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- Estimates of Beamline availability in 2012, 2014 and 2016 for the specific technique.
- Variability in BE could reflect changes in operation status (i.e. upgrades) or fractional application of the technique on the beamline.
- Each table gives additional notes that may guide in selecting appropriate beamlines.
- This should be a good starting guide for understanding when resource availability will change and where you can go to continue to do your science.
- This is just a start, inquire with each facility and beamline staff.

Macromolecular Crystallography (MX)			Resources Available - BE		
			Mid 2012	Mid 2014	Mid 2016
Beamline	X-ray Source	GU*	Total	Total	Total
NSLS			8	8	0
X4A	bend	0.25	**1**	**1**	0
X4C	bend	0.25	**1**	**1**	0
X6A	bend	0.75	**1**	**1**	0
X12B	bend	0.75	**1**	**1**	0
X12C	bend	0.75	**1**	**1**	0
X25	undulator	0.75	**1**	**1**	0
X26C**	bend	0.75	**1**	**1**	0
X29	undulator	0.75	**1**	**1**	0
APS			17	17	17
14-BM-C BioCars	bend	1	1	1	1
14-ID-B BioCars	undulator	?	1	1	1
17-BM IMCA-CAT	bend	1	1	1	1
17-ID IMCA-CAT	undulator	0.25	*1*	*1*	1
19-BM SBC-CAT	bend	0.75	1	1	1
19-ID SBC-CAT	undulator	0.75	1	1	1
21-ID-F LS-CAT	undulator	0.25	1	1	1
21-ID-D LS-CAT	undulator	0.25	1	1	1
21-ID-G LS-CAT	undulator	0.25	1	1	1
22-BM SER-CAT	bend	0.25	1	1	1
22-ID SER-CAT	undulator	0.25	1	1	1
23-BM-B GM/CA-CAT	bend	0.25	1	1	1
23-ID-B GM/CA-CAT	undulator	0.25	1	1	1
23-ID-D GM/CA-CAT	undulator	0.25	1	1	1
24-ID-C NE-CAT	undulator	0.5	1	1	1
24-ID-E NE-CAT	undulator	0.5	1	1	1
31-ID LRL-CAT, Eli Lilly	undulator	0.25	1	1	1
ALS			8	8	8
4.2.2	super bend	0.25	1	1	1
5.0.1	wiggler	0.25	1	1	1
5.0.2	wiggler	0.25	1	1	1
5.0.3	wiggler	0.25	1	1	1
8.2.1	bend	0.25	1	1	1
8.2.2	super bend	0.25	1	1	1
8.3.1	super bend	0.25	1	1	1
12.3.1	super bend	0.25	1	1	1
SSRL			6	6	6
BL7-1	wiggler	1	1	1	1
BL9-1	wiggler	1	1	1	1
BL9-2	wiggler	1	1	1	1
BL11-1	wiggler	0.33	1	1	1
BL12-2	undulator	0.6	1	1	1
BL14-1	bend	0.25	1	1	1
NSLS-II			**0**	**0**	**3**
NYX	undulator	1	0	0	1
FMX	undulator	1	0	0	1
AMX	undulator	1	0	0	1
SM3**	3PW	1	0	0	0
Totals			**39**	**39**	**34**

Hard X-ray Inelastic Scattering			Resources Available - BE				
			Mid 2012	Mid 2014	Mid 2016		
Beamline	Technique	X-ray Source	Total	Total	Total		
NSLS			0	0	0		
None							
APS			3.9	3.9	5.2		
3-ID-B,D	NRIXS, 0.5-2 meV	Undulator	**0.5**	**0.5**	**0.5**		
3-ID-C	HERIX, 1-3 meV	Undulator	**0.5**	**0.5**	**0.5**		
9-ID-B	MERIX, 70-300 meV	Undulator	**0.5**	**0.5**	**1**[a]		
16-ID-B	NRIXS, 0.5-2 meV	Undulator	**0.3**	**0.3**	**0.3**		
16-ID-B	XRS, (R)-XES, 1 eV	Undulator	**0.6**	**0.6**	**0.6**		
20-ID	LERIX, 1 eV	Undulator	**0.25**	**0.25**	**0.75**[b]		
20-ID	XES (by miniXS), 1 eV	Undulator	**0.25**	**0.25**	**0.75**[b]		
30-ID-B	MERIX, 70-300 meV	Undulator	**0.5**	**0.5**	**0**[a]		
30-ID-C	HERIX, 1-3 meV	Undulator	**0.5**	**0.5**	**0.8**[a]		
ALS			0	0	0		
None							
SSRL			0	0	0		
BL6-2			**1**	**1**	**1**		hard x-ray RIX/Raman
NSLS-II			0	0	1		
IXS	HERIX, 0.1-1 meV	Undulator	0	0	1	Project	Funded and under construction in NSLS-II Project - Available 2(
HIX	H-RIX, 10-50 meV[c]	Undulator	0	0	0		Approved but not yet funded
HIX	I-RIX, 200-300 meV[d]	Undulator	0	0	0		Approved but not yet funded
Totals - NRIXS			**0.8**	**0.8**	**0.8**		
Totals - HERIX			**1**	**1**	**2.3**		
Totals - MERIX			**1**	**1**	**1**		
Totals - LERIX			**0.25**	**0.25**	**0.75**		
Totals - XRS, (R)-XES			**0.85**	**0.85**	**1.35**		
Total			**3.9**	**3.9**	**6.2**		

NRIXS, 0.5-2 meV: Nuclear Resonant IXS (momentum integrated vibrational dynamics, phonon density of states)

HERIX, 1-3 meV: High Energy Resolution IXS (momentum resolved vibrational dynamics, phonons)

MERIX, 70-300 meV: Medium Energy Resolution IXS (momentum resolved charge dynamics, including both resonant and non-resonant studies)

LERIX, 1 eV: Low Energy Resolution IXS (momentum resolved charge dynamics, valence and core electronic excitations)

XRS, (R)-XES, 1 eV: X-ray Raman Scattering, (Resonant) X-ray Emission Spectroscopy

BE - Beamline equivalent - 1 BE is a station running the full operating schedule of the facility. Typically 5000 Hrs/yr

Boldface = all IXS capabilities are oversubscribed by various amount

Footnotes:

a = Changes due to APS upgrade plan to combine MERIX of 30-ID with that of 9-ID into a fully dedicated beamline for MERIX experiments

b = Changes due to APS upgrade plan to create two beamlines out of the exisitng 20-ID using canted undulators

c = H-RIX is similar to MERIX but with improved energy resolution to 10-50 meV, designed for studies of momentum resolved charge dynamics.

d = I-RIX is simiar to LERIX but with improved energy resolution to 200-300 meV, which matches the lifetime of the core holes

Technique	Resources Available - BE				Change in Resources available 2012-2016			
Spectroscopy	**FY2012**	**FY2014 (planned)**	**Oct. 2014**	**Mid 2016**	**Δ**	**Δ (no NxtGen)**	**%Δ**	**%Δ (no NxtGen)**
01 - Low Energy Spectroscopy	12.3	12.8	7.3	9.3	-3.00	-5.00	-24.39%	-40.65%
02 - Soft/Tender X-Ray Spectroscopy	10.4	11.4	7.7	9.6	-0.75	-1.75	-7.25%	-16.91%
03 - Hard X-ray Spectroscopy	17.6	18.3	11.3	12.3	-5.30	-6.30	-30.20%	-35.90%
04 - Optics/Calibration/Metrology	9.7	10.0	3.7	4.7	-4.95	-5.95	-51.30%	-61.66%
Scattering								
05 X-ray Diffraction	24.9	25.2	17.8	19.1	-5.80	-6.80	-23.34%	-27.36%
06 MX, footprinting	40.0	40.0	31.0	34.0	-6.00	-6.00	-15.00%	-15.00%
07 Hard X-ray Scattering	40.8	40.8	29.4	36.6	-4.25	-6.25	-10.42%	-15.32%
08 Soft X-Ray Scattering	11.4	11.6	9.7	12.0	0.60	0.60	5.26%	5.26%
Imaging								
09- Hard X-ray Imaging	15.2	15.5	11.5	15.5	0.25	-0.75	1.64%	-4.93%
10- Soft X-ray Imaging	4.5	4.6	4.6	4.6	0.10	0.10	2.22%	2.22%

- Overall beamline equivalent (BE) availability will decrease roughly 15-20% nationally. Expect increased competition for beamtime.
- Most generalized techniques will see less time available with “spectroscopy” techniques being the most highly impacted as a group.
- Be aware of dates when resources will change and consider deadlines for beamtime proposal submission at each facility to avoid gaps.

Number	Technique	FY12	FY14	Oct. 14	FY16*	% D (2012)	% D (no NxtGen)
01-01	Infrared	4.5	5.0	2.0	4.0	-11.11%	-55.56%
01-02	Photoemission	7.8	7.8	5.3	5.3	-32.05%	-32.05%
02-01	Soft X-ray Spectroscopy	8.9	8.9	6.7	7.6	-14.12%	-14.12%
02-02	Tender XAS	1.5	2.5	1.0	2.0	33.33%	-33.33%
03-01	EXAFS	17.6	18.3	11.3	12.3	-30.20%	-35.90%
04-01	Metrology	9.7	10.0	3.7	4.7	-51.30%	-61.66%
05-01	X-Ray Powder Diffraction	14.2	14.2	9.0	10.0	-29.58%	-36.62%
05-02	Extreme Conditions	7.0	7.2	5.5	5.8	-17.14%	-17.14%
05-03	Energy Dispersive	0.4	0.4	0.1	0.1	-75.00%	-75.00%
05-04	Micro-Beam Diffraction	3.3	3.4	3.2	3.2	-3.08%	-3.08%
06-01	Macromolecular Crystallography	39.0	39.0	31.0	34.0	-12.82%	-12.82%
06-02	X-ray footprinting	1.0	1.0	0.0	0.0	-100.00%	-100.00%
07-01	SAXS/WAXS/GISAXS/Liq Surface	14.0	14.0	9.0	10.5	-25.00%	-32.14%
07-02	Resonant & High Magnetic-Field Scattering	2.8	2.8	2.0	2.8	0.00%	-16.36%
07-03	General Diffraction	9.6	9.6	6.7	6.8	-29.17%	-30.21%
07-04	In-Situ Scattering	5.7	5.7	3.2	4.7	-18.42%	-26.32%
07-05	XPCS	2.0	2.0	2.0	2.5	25.00%	25.00%
07-06	Solution, BioSAXS	2.4	2.4	2.2	2.7	12.77%	12.77%
07-07	Hard IXS	4.4	4.4	4.4	6.7	52.27%	52.27%
08-01	Soft X-ray Scattering	5.8	5.8	4.3	6.3	9.57%	9.57%
08-02	Pump/Probe	5.7	5.9	5.7	5.7	0.88%	0.88%
08-03	Soft IXS	1.2	1.2	0.7	0.7	-41.67%	-41.67%
09-01	HX Micro/Nano-probe	7.6	7.8	5.8	9.8	28.95%	15.79%
09-02	TXM	1.9	2.1	1.1	1.1	-42.11%	-42.11%
09-03	Topography	1.0	1.3	0.3	0.3	-75.00%	-75.00%
09-04	micro-CT	2.8	1.9	1.9	1.9	-32.73%	-32.73%
09-05	Coherent Diffraction Imaging	2.0	2.5	2.5	2.5	25.32%	25.32%
10-01	Soft X-ray Microprobe	4.5	4.6	4.6	4.6	2.22%	2.22%
	Total:	187.8	191.2	134.9	158.2	-15.76%	-20.55%

*includes NxtGen

Techniques nationally that will likely have additional capacity by 2016

Number	Technique	FY12	FY14	Oct. 14	FY16*	% D (2012)	% D (no NxtGen)	
01-01	Infrared	4.5	5.0	2.0	4.0	-11.11%	-55.56%	
01-02	Photoemission	7.8	7.8	5.3	5.3	-32.05%	-32.05%	
02-01	Soft X-ray Spectroscopy	8.9	8.9	6.7	7.6	-14.12%	-14.12%	
02-02	Tender XAS	1.5	2.5	1.0	2.0	33.33%	-33.33%	
03-01	EXAFS	17.6	18.3	11.3	12.3	-30.20%	-35.90%	
04-01	Metrology	9.7	10.0	3.7	4.7	-51.30%	-61.66%	
05-01	X-Ray Powder Diffraction	14.2	14.2	9.0	10.0	-29.58%	-36.62%	
05-02	Extreme Conditions	7.0	7.2	5.5	5.8	-17.14%	-17.14%	
05-03	Energy Dispersive	0.4	0.4	0.1	0.1	-75.00%	-75.00%	
05-04	Micro-Beam Diffraction	3.3	3.4	3.2	3.2	-3.08%	-3.08%	
06-01	Macromolecular Crystallography	39.0	39.0	31.0	34.0	-12.82%	-12.82%	
06-02	X-ray footprinting	1.0	1.0	0.0	0.0	-100.00%	-100.00%	
07-01	SAXS/WAXS/GISAXS/Liq Surface	14.0	14.0	9.0	10.5	-25.00%	-32.14%	
07-02	Resonant & High Magnetic-Field Scattering	2.8	2.8	2.0	2.8	0.00%	-16.36%	
07-03	General Diffraction	9.6	9.6	6.7	6.8	-29.17%	-30.21%	
07-04	In-Situ Scattering	5.7	5.7	3.2	4.7	-18.42%	-26.32%	
07-05	XPCS	2.0	2.0	2.0	2.5	25.00%	25.00%	★
07-06	Solution, BioSAXS	2.4	2.4	2.2	2.7	12.77%	12.77%	★
07-07	Hard IXS	4.4	4.4	4.4	6.7	52.27%	52.27%	★
08-01	Soft X-ray Scattering	5.8	5.8	4.3	6.3	9.57%	9.57%	★
08-02	Pump/Probe	5.7	5.9	5.7	5.7	0.88%	0.88%	
08-03	Soft IXS	1.2	1.2	0.7	0.7	-41.67%	-41.67%	
09-01	HX Micro/Nano-probe	7.6	7.8	5.8	9.8	28.95%	15.79%	★
09-02	TXM	1.9	2.1	1.1	1.1	-42.11%	-42.11%	
09-03	Topography	1.0	1.3	0.3	0.3	-75.00%	-75.00%	
09-04	micro-CT	2.8	1.9	1.9	1.9	-32.73%	-32.73%	
09-05	Coherent Diffraction Imaging	2.0	2.5	2.5	2.5	25.32%	25.32%	★
10-01	Soft X-ray Microprobe	4.5	4.6	4.6	4.6	2.22%	2.22%	★
	Total:	187.8	191.2	134.9	158.2	-15.76%	-20.55%	

*includes NxtGen

XPCS:
NSLS-2 CHX

Solution/Bio-SAXS:
NSLS-2 LIX

Hard IXS:
APS 9-ID, 20-ID, 30-ID
NSLS-2 IXS

Soft XRS:
APS IEX
ALS COSMIC
NSLS-2 CSX

HX Micro/Nano-probe:
APS 13-ID, 8-BM, 21-ID
SSRL BL2-2
NSLS-2 SRX, HXN

CDI:
ALS COSMIC

Soft X-ray microprobe:
SSRL 13-1

Techniques nationally that are served by few beamlines and face lowered availability or uncertainty in 2016

Number	Technique	FY12	FY14	Oct. 14	FY16*	% D (2012)	% D (no NxtGen)	
01-01	Infrared	4.5	5.0	2.0	4.0	-11.11%	-55.56%	★
01-02	Photoemission	7.8	7.8	5.3	5.3	-32.05%	-32.05%	
02-01	Soft X-ray Spectroscopy	8.9	8.9	6.7	7.6	-14.12%	-14.12%	
02-02	Tender XAS	1.5	2.5	1.0	2.0	33.33%	-33.33%	★
03-01	EXAFS	17.6	18.3	11.3	12.3	-30.20%	-35.90%	
04-01	Metrology	9.7	10.0	3.7	4.7	-51.30%	-61.66%	
05-01	X-Ray Powder Diffraction	14.2	14.2	9.0	10.0	-29.58%	-36.62%	
05-02	Extreme Conditions	7.0	7.2	5.5	5.8	-17.14%	-17.14%	
05-03	Energy Dispersive	0.4	0.4	0.1	0.1	-75.00%	-75.00%	
05-04	Micro-Beam Diffraction	3.3	3.4	3.2	3.2	-3.08%	-3.08%	
06-01	Macromolecular Crystallography	39.0	39.0	31.0	34.0	-12.82%	-12.82%	
06-02	X-ray footprinting	1.0	1.0	0.0	0.0	-100.00%	-100.00%	★
07-01	SAXS/WAXS/GISAXS/Liq Surface	14.0	14.0	9.0	10.5	-25.00%	-32.14%	
07-02	Resonant & High Magnetic-Field Scattering	2.8	2.8	2.0	2.8	0.00%	-16.36%	★
07-03	General Diffraction	9.6	9.6	6.7	6.8	-29.17%	-30.21%	
07-04	In-Situ Scattering	5.7	5.7	3.2	4.7	-18.42%	-26.32%	
07-05	XPCS	2.0	2.0	2.0	2.5	25.00%	25.00%	
07-06	Solution, BioSAXS	2.4	2.4	2.2	2.7	12.77%	12.77%	
07-07	Hard IXS	4.4	4.4	4.4	6.7	52.27%	52.27%	
08-01	Soft X-ray Scattering	5.8	5.8	4.3	6.3	9.57%	9.57%	
08-02	Pump/Probe	5.7	5.9	5.7	5.7	0.88%	0.88%	
08-03	Soft IXS	1.2	1.2	0.7	0.7	-41.67%	-41.67%	★
09-01	HX Micro/Nano-probe	7.6	7.8	5.8	9.8	28.95%	15.79%	
09-02	TXM	1.9	2.1	1.1	1.1	-42.11%	-42.11%	★
09-03	Topography	1.0	1.3	0.3	0.3	-75.00%	-75.00%	★
09-04	micro-CT	2.8	1.9	1.9	1.9	-32.73%	-32.73%	
09-05	Coherent Diffraction Imaging	2.0	2.5	2.5	2.5	25.32%	25.32%	
10-01	Soft X-ray Microprobe	4.5	4.6	4.6	4.6	2.22%	2.22%	
	Total:	187.8	191.2	134.9	158.2	-15.76%	-20.55%	

*includes NxtGen

Infra-red Spectroscopy:
Loss 4 NSLS beamlines
New ALS 5.4.1, 5.4.3

Tender XAS:
Loss NSLS X15B and X19A
New SSRL 14-3

X-ray Footprinting:
Loss NSLS X28C

Resonant/High MF Scatter.:
Loss NSLS X21 and X22C
Increase APS 6-ID
NEXT ISR (2017)

Soft IXS:
Loss NSLS X1B
NEXT SIX (2017)

TXM:
Loss NSLS X8C
Increase APS 32-ID
NEXT FXI (2017)

Topography:
Loss NSLS X19C
Increase APS 1-BM

High User-volume techniques (≥ 9 beamlines) nationally that will see notable losses in BE through 2016

Number	Technique	FY12	FY14	Oct. 14	FY16*	% D (2012)	% D (no NxtGen)
01-01	Infrared	4.5	5.0	2.0	4.0	-11.11%	-55.56%
01-02	Photoemission	7.8	7.8	5.3	5.3	-32.05%	-32.05%
02-01	Soft X-ray Spectroscopy	8.9	8.9	6.7	7.6	-14.12%	-14.12%
02-02	Tender XAS	1.5	2.5	1.0	2.0	33.33%	-33.33%
03-01	EXAFS	17.6	18.3	11.3	12.3	-30.20%	-35.90%
04-01	Metrology	9.7	10.0	3.7	4.7	-51.30%	-61.66%
05-01	X-Ray Powder Diffraction	14.2	14.2	9.0	10.0	-29.58%	-36.62%
05-02	Extreme Conditions	7.0	7.2	5.5	5.8	-17.14%	-17.14%
05-03	Energy Dispersive	0.4	0.4	0.1	0.1	-75.00%	-75.00%
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09-03	Topography	1.0	1.3	0.3	0.3	-75.00%	-75.00%
09-04	micro-CT	2.8	1.9	1.9	1.9	-32.73%	-32.73%
09-05	Coherent Diffraction Imaging	2.0	2.5	2.5	2.5	25.32%	25.32%
10-01	Soft X-ray Microprobe	4.5	4.6	4.6	4.6	2.22%	2.22%
	Total:	187.8	191.2	134.9	158.2	-15.76%	-20.55%

*includes NxtGen

Soft X-ray spectroscopy:
Loss of 5 NSLS beamlines
NSLS-2 CSX, SST

EXAFS:
Loss of 10 NSLS beamlines
No additional until NSLS-2
ISS (2017)

Metrology:
Loss of 10 NSLS beamlines
Increase APS BM-6

X-ray Powder Diff.:
Loss 7 NSLS beamlines
NSLS-2 XPD

MX:
Loss 8 NSLS beamlines
3 NSLS-2 beamlines

SAXS/WAXS/GISAXS:
Loss 5 NSLS beamlines
NSLS-2 CHX

General Diff.:
Loss 5 NSLS beamlines

Conclusions/Discussion

- Come October 2014 (at the latest) beamtime availability nationally will decrease 15-20%.
  - Are you ready?
  - Where will you seek beamtime?
  - When do you plan to submit proposals?
  - Expect increased competition.
  - Are you accounting for this in submitting grant proposals and in supporting students?
  - How will facilities cooperate to mitigate these issues?
- Some techniques will be impacted significantly beyond 2016. What long term recommendations does the user community have?
  - Funds for additional beamlines at all facilities to increase capacity? If so which?
  - Funds to increase beamline efficiency rather than simply capacity (robotics, remote capabilities, software development, staffing, etc.)
- Are we at risk of sacrificing high demand synchrotron“bread-and butter” techniques (EXAFS, Diffraction, SAXS/WAXS) for high-risk, technically challenging beamlines that impact less users?