

Welcome and Introduction to NSLS-II



Qun Shen

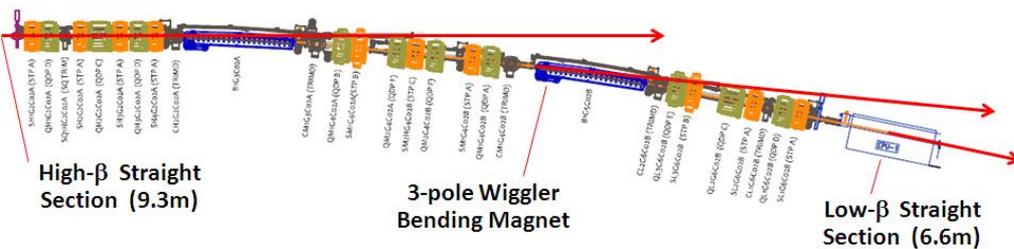
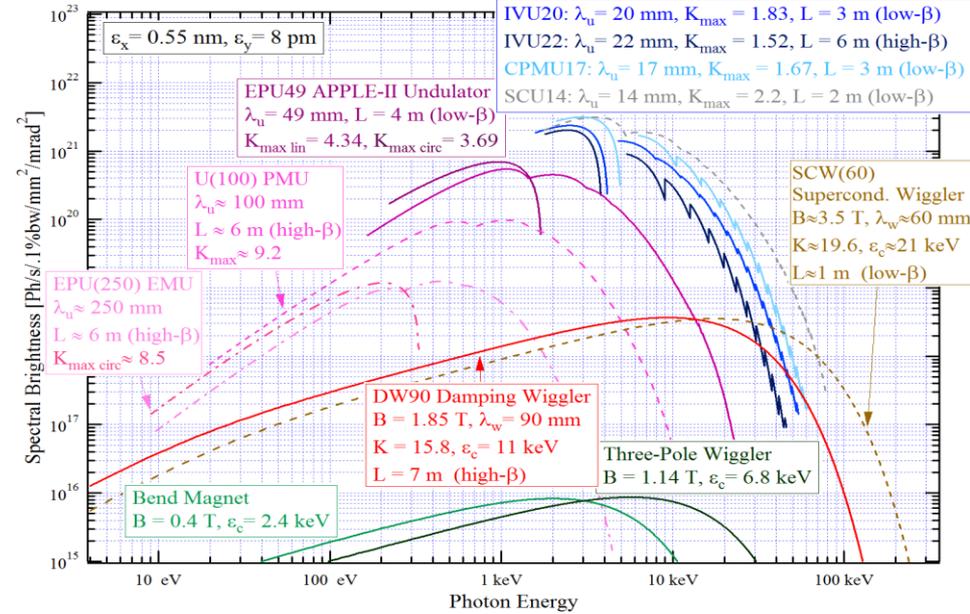
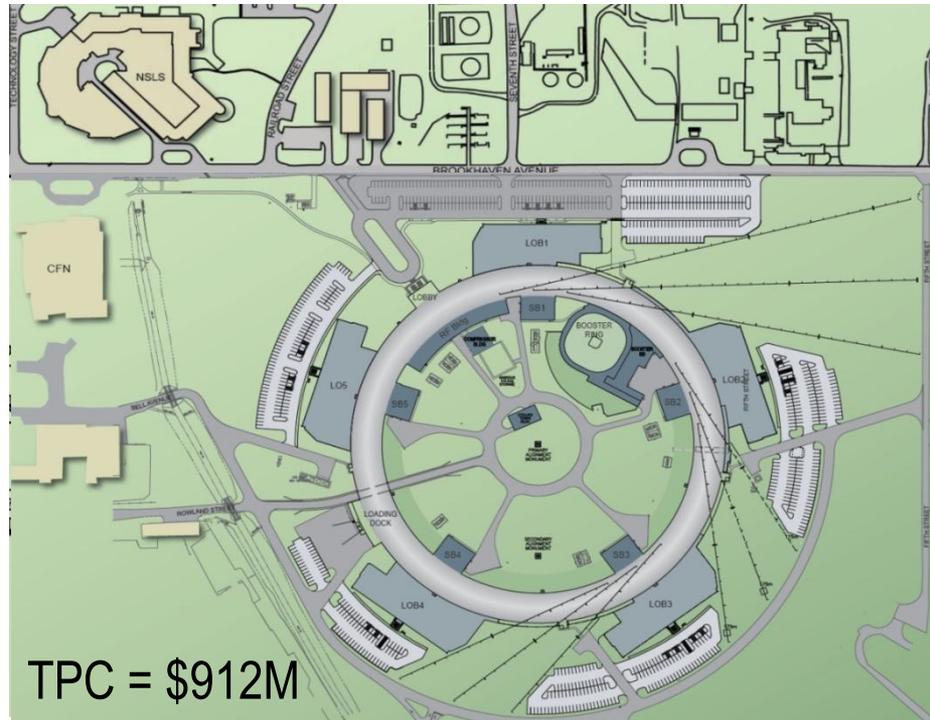
Photon Division Director, Photon Sciences Directorate

Soft X-ray Spectromicroscopy Workshop

Brookhaven National Laboratory

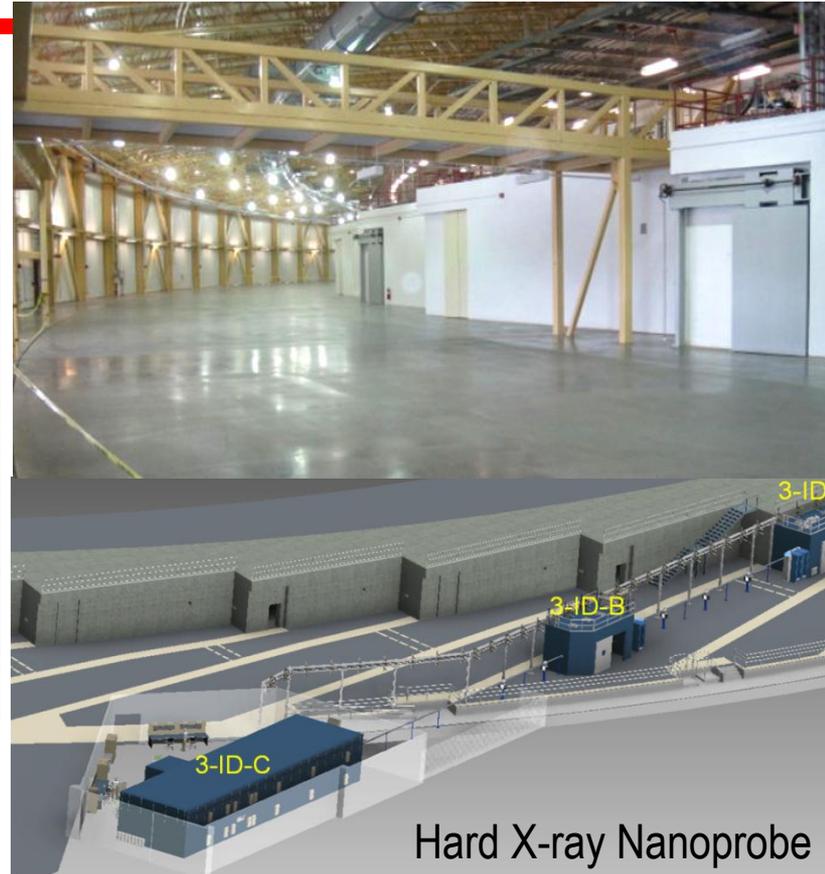
May 20, 2011

NSLS-II: Optimized 3rd Generation SR



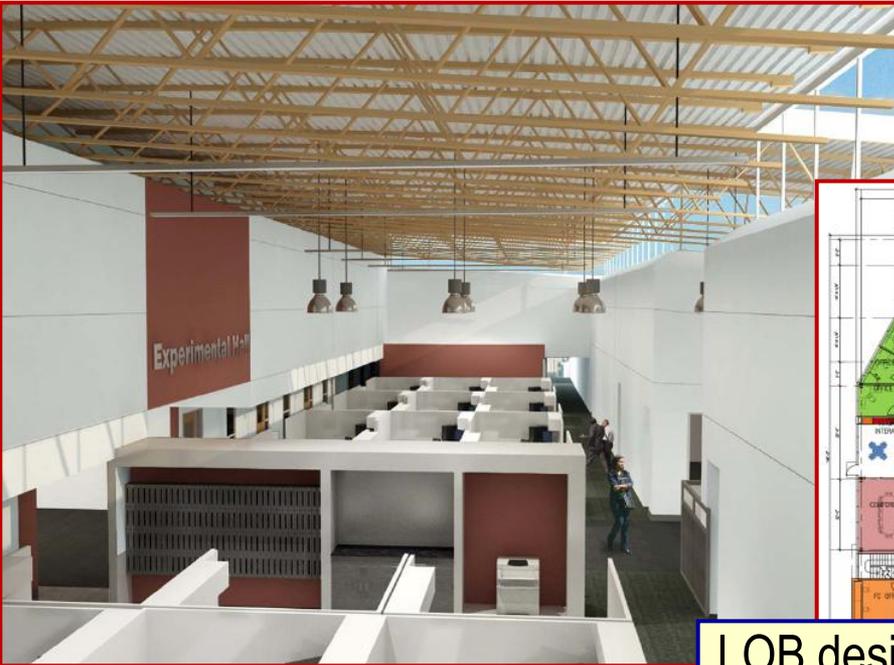
- 3 GeV, 500 mA, Circumference 791 m
- Emittance: $\epsilon_x = 0.55$, $\epsilon_y = 0.008$ nm-rad
- High brightness from soft to hard x-rays
- Small beam size: $\sigma_y = 2.6 \mu\text{m}$, $\sigma_x = 28 \mu\text{m}$
- Pulse length (rms) ~ 15 psec
- 27 insertion device beamlines
- 31 BM / 3PW / IR beamlines
- High brightness, small beam size, long BLs particularly good for imaging

NSLS-II Construction Progress



- NSLS-II project progressing on budget and on schedule
- Pentant 1 Beneficial occupancy received Mar 14, 2011; Accelerator installation and beamline procurements have begun
- Expected start of operations in Mar. 2014

Laboratory Office Bldg.

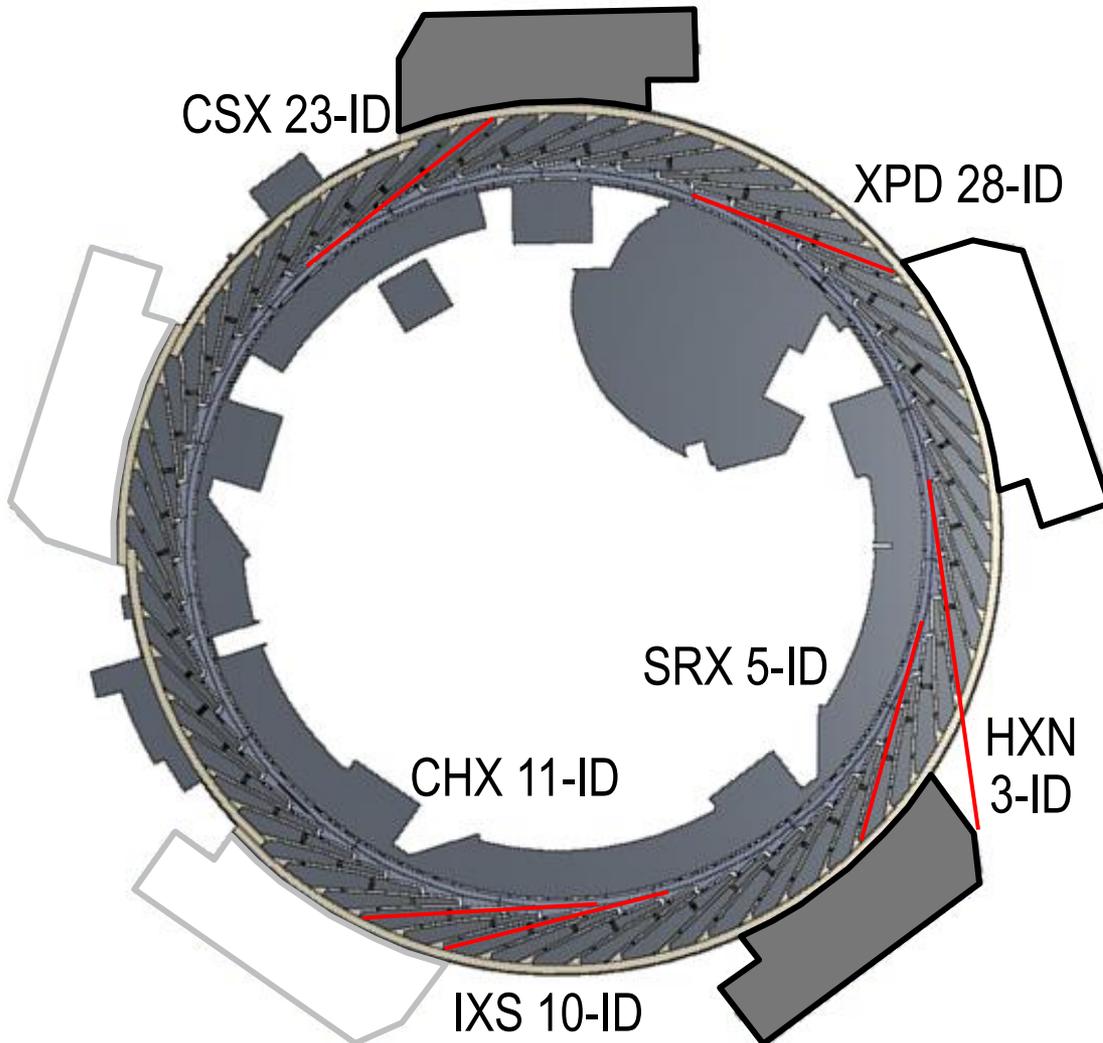


LOB design: 33,600 ft²

- 120 seats
- 10 laboratories
- machine shop
- conference rooms
- loading/storage area



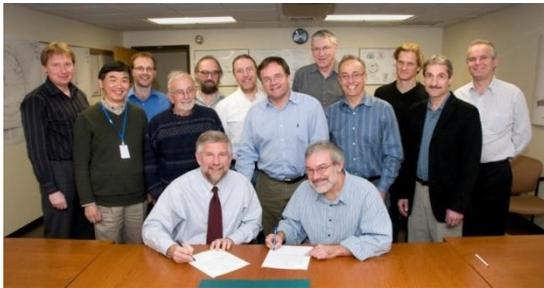
Six Beamlines in Construction Project



- Inelastic X-ray Scattering (IXS)
- Hard X-ray Nanoprobe (HXN)
- Coherent Hard X-ray Scattering (CHX)
- Coherent Soft X-ray Scattering & Polarization (CSX)
- Sub-micron Resolution X-ray Spectroscopy (SRX)
- X-ray Powder Diffraction (XPD)
- *Beamline locations finalized for the six project beamlines*
- *Preliminary designs completed*
- *Procurement of long-lead-time components in progress*
- *Commissioning and ramp-up of operations to start March 2014*

Beamline Advisory Teams

- All NSLS-II beamlines are being developed using the concept of Beamline Advisory Teams (BATs).
 - BAT represents a segment of user community;
 - works close with facility to define scientific mission and technical scope;
 - meets regularly with facility staff in design, construction, and commissioning.



SRX BAT



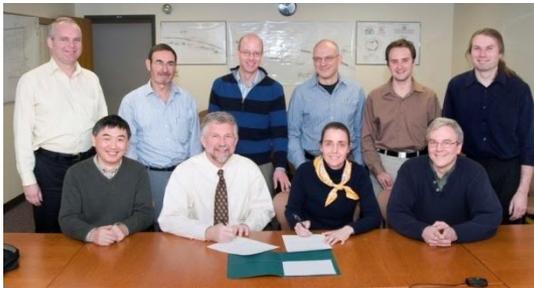
XPD BAT



IXS BAT



CHX BAT



CSX BAT



HXN BAT

Development Process of Additional Beamlines

2010 Call for Beamline Development Proposals National Synchrotron Light Source II

March 26, 2010



Critical Dates

Call for proposal issued
March 26, 2010

Informational session
Wednesday, April 14, 2010
[Agenda](#) | [Video](#) (RealPlayer)

Letter of Intent due Monday,
April 26, 2010
([submitted LOIs](#))

[Beamline development workshops](#)
April-June 2010

Beamline proposal due Monday,
June 21, 2010

SAC review
Summer 2010

Related Materials

[Proposal template](#)

[NSLS-II Beamline Development Policy](#)

[NSLS-II Source Properties](#)

[NSLS & NSLS-II User Access Policy \(draft\)](#)

[Conceptual Design Report for Six Project Beamlines](#)

[Background Beamline Information](#)

• Scope

- All areas of science and beamline types – ID, BM, 3PW, IR
- Independent of funding source or implementation approach

• Science case and technical requirements

• Results

- 54 Beamline Development Proposals received by Jun 21
- Reviewed by Science Advisory Committee & Study Panels
- 34 BDPs approved; Results announced Oct 4, 2010

34 Approved Proposals Posted On-Line

<http://www.bnl.gov/nsls2/beamlines/2010BeamlineProposal-Approved.asp>

2010 Beamline Development Proposals — Approved Proposals

[Proposal Results Announcement](#)

NSLS-II People

[NSLS-II Home](#)

Organization

[Organization Chart \(PDF\)](#)

[Staff Directory](#)

Site Information

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Related Websites

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[NSLS Home](#)

[Center for Functional Nanomaterials](#)

[Brookhaven Lab Home](#)

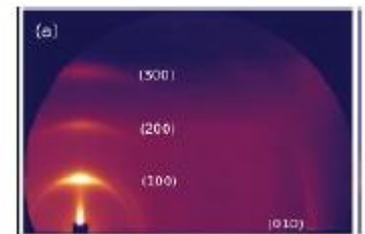
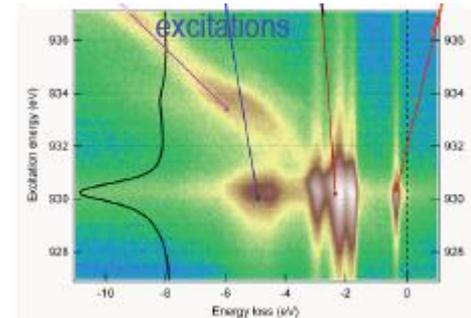
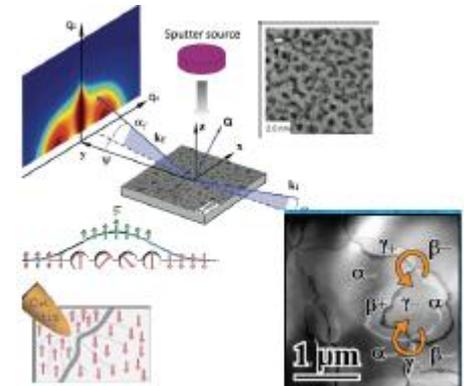
Acronym	Title	Spokesperson	Type	Information
4DE	4-Dimensional Studies in Extreme Environments	Donald J. Weidner, Stony Brook University	1	Slide
ABS	A Highly Automated Instrument for Static X-ray Scattering Measurements of Biological Molecules in Solution	Lin Yang, BNL	1	Slide
AIM	Advanced Infrared Microspectroscopy	Lisa Miller, BNL	1	Slide
AMX	Flexible Access Macromolecular Crystallography at an Undulator Beamline	Dieter Schneider, BNL	1	Slide Proposal
BMM	Hard X-ray Absorption Spectroscopy and Diffraction - Beamline for Materials Measurements	Daniel Fischer, NIST	2	Slide Proposal
CDI	Coherent X-ray Diffraction	Ian Robinson, University College London	1	Slide Proposal
CMS	Complex Materials Scattering	Kevin Yager, BNL	1	Slide Proposal
ESM	Electron Spectro-microscopy for Fundamental Studies of the Physics and Chemistry of Materials	Elio Vescovo, BNL	1	Slide
FIS	Frontier Synchrotron Infrared Spectroscopy Beamline Under Extreme Conditions	Zhenxian Liu, Carnegie Institution of Washington	1	Slide
FMX	Frontier Macromolecular Crystallography at an Undulator Beamline	Robert Sweet, BNL	1	Slide Proposal
FXI	A Superconducting Wiggler Long-Field Imaging at NSLS-II		1	Slide
HIX			1	Slide
IRI			1	Slide
ISR		Karl Ludwig, Boston University	1	Slide Proposal
ISS	Infrared Spectroscopy	Bruce Ravel, NIST	1	Slide Proposal

2011 Call Beamline Development Proposals
Letter of Intent: due March 28, 2011
Proposal: due June 6, 2011

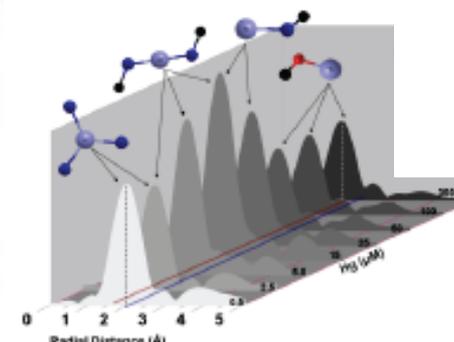
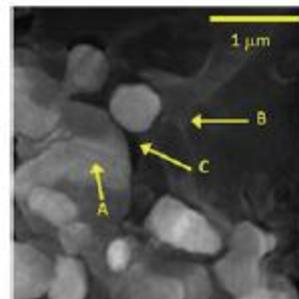
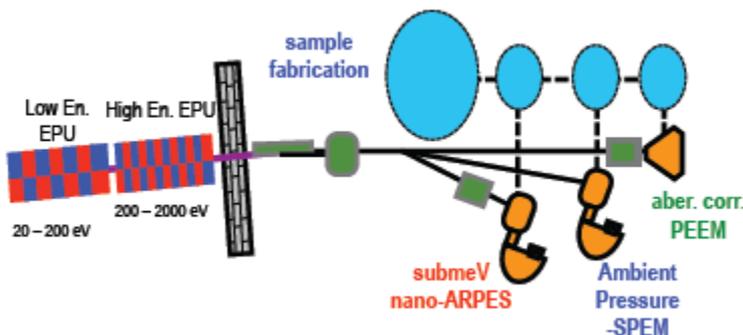


NEXT Project – 6 Beamlines Funded by DOE BES

ESM	Electron Spectro-Microscopy
FXI	Full-field X-ray Imaging from μm to nm
ISS	Inner Shell Spectroscopy
ISR	Integrated In-Situ & Resonant X-Ray Studies
SIX	Soft Inelastic X-ray Scattering
SMI	Soft Matter Interfaces

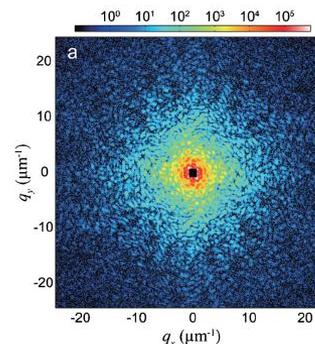
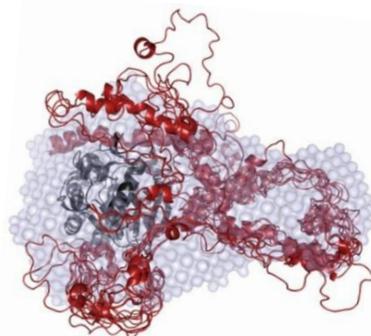
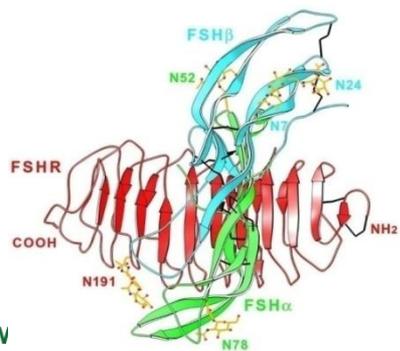


- Beamline group leaders and engineers job openings are posted
- Steve Hulbert named interim Beamline Project Manager; Interim lead scientists appointed
- Beamline advisory teams to be formed



NIH Beamlines

- NIH Advisory Panel for Biomedical Beamlines at NSLS-II formed in May 2010, to advise NIH about beamline development at NSLS-II
- NSLS-II recommended 4 beamlines be supported by NIH as result of 2010 SAC review; NIH Advisory Panel met on Feb 24, and recommended to pursue 3 beamlines:
 - 2 MX beamlines: Frontier MX (FMX), Automated MX (AMX)
 - 1 scattering beamline: X-ray scattering for life sciences (LIX)
 - Imaging beamline has considerable potential at NSLS-II due to high brightness and small horizontal source size, but funding is insufficient



Overall Beamline Development Schedule

NSLS-II Projected Early Finish 							 CD-4
FY09	FY10	FY11	FY12	FY13	FY14	FY15	<u>Total Beamlines</u>
6 NSLS-II Project Beamlines							6
6 NEXT Beamlines							12
3 NIH Beamlines							15
3 Type II Beamlines							18
. . . NxtGen Beamlines							18+

- Aggressive schedule is being planned to ramp up a good number of beamlines at the first year of NSLS-II operations, both for delivering enabling capabilities and for accommodating existing communities at NSLS
- NEXT and NIH funding are reasonably assured
- Funding for NxtGen (3PW/BM/IR) beamlines is under discussion with DOE

SAC Review Criteria

- **Science Case:** Does the research enabled by establishment of the proposed beamline have the potential to address important scientific and/or societal questions?
- **User Demand:** Is there evidence of significant interest, engagement, and support for the proposed beamline facility by the scientific community?
- **Performance:** Will the proposed beamline provide the performance necessary to fulfill its scientific mission, with characteristics well matched to the NSLS-II source?
- **Technical Feasibility:** Is achieving the proposed beamline capabilities technically feasible?
- **Quality of Proposal Team:** Are the proposal team members experienced in the proposed field of research and/or technique and are they representative of the corresponding user community that would be served by the beamline?

Summary

- NSLS-II construction project (including 6 project BLs) progressing well
- Additional beamline projects getting started (NEXT, NIH)
- Photon Sciences staff are excited to work with scientific community to define and pursue cutting-edge experimental programs at NSLS-II
- Looking forward to the discussion at this workshop

