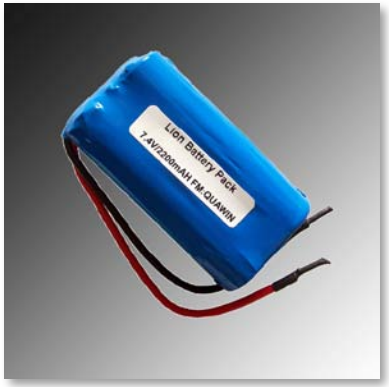
APS Update

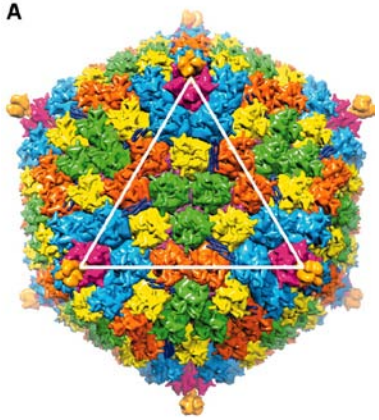
Brian Stephenson

Advanced Photon Source

Argonne National Laboratory

October 29, 2010





APS Update

Safety

- Electrical Equipment Inspections
- Hazardous Sample Transport On Site

Budget

SAC Meeting October 8:

- Cross-cut Review of Interface Science
- Scientific Review of Upgrade Components

Electrical Equipment Inspections

- All incoming electrical equipment must be inspected
- APS maintains an inventory of existing electrical equipment
- 100% of existing electrical equipment must be inspected by September 30th 2011.

Present APS Data September 2010, FY 2010 goal 80%

	White	Green	Red	Blue	%
ASD	5038	3462	261	1075	93.94%
AES	5314	3707	91	1075	89.60%
XSD	5112	2587	491	1544	86.27%
non-ANL	1655	358	33	258	27.99%
APS	17119	10114	876	3952	83.47%

Goal for 80%	10534	80.0%
Total at present with percent	10990	83.5%
Needed to be done	-456	

White - all identified devices
Green - Devices whichhave been inspected and passed
Red - Devices which have been removed from service
Blue - Devices which have been identified as NRTL

PerCent calculation is (Green+Red)/(White-Blue)

Electrical Equipment Inspections

Need your help to close out inspections, in particular of non-ANL beamline equipment

To schedule inspections or for further information

- Non ANL Beamlines contact Clay White
  - 2-0300
  - cawhite@aps.anl.gov
- ANL and APS personnel should contact their Designated Electrical Equipment Inspectors.

Transport of Research Samples on Site

- Certain research materials are hazardous (including radioactive), or are subject to other special requirements
  - Hazardous materials are defined by 49 CFR
  - Permitting such as USDA, CDC or DEA

- DOT allows transport of small quantities (max 30ml/30g sometimes less) of these materials by individuals provided that they are appropriately packaged and handled.

- Some universities and other organizations permit the transport of small quantities of these materials in personal vehicles, but **DOE does not permit ANL employees to use their personal vehicles.**

Transport of Research Samples on Site

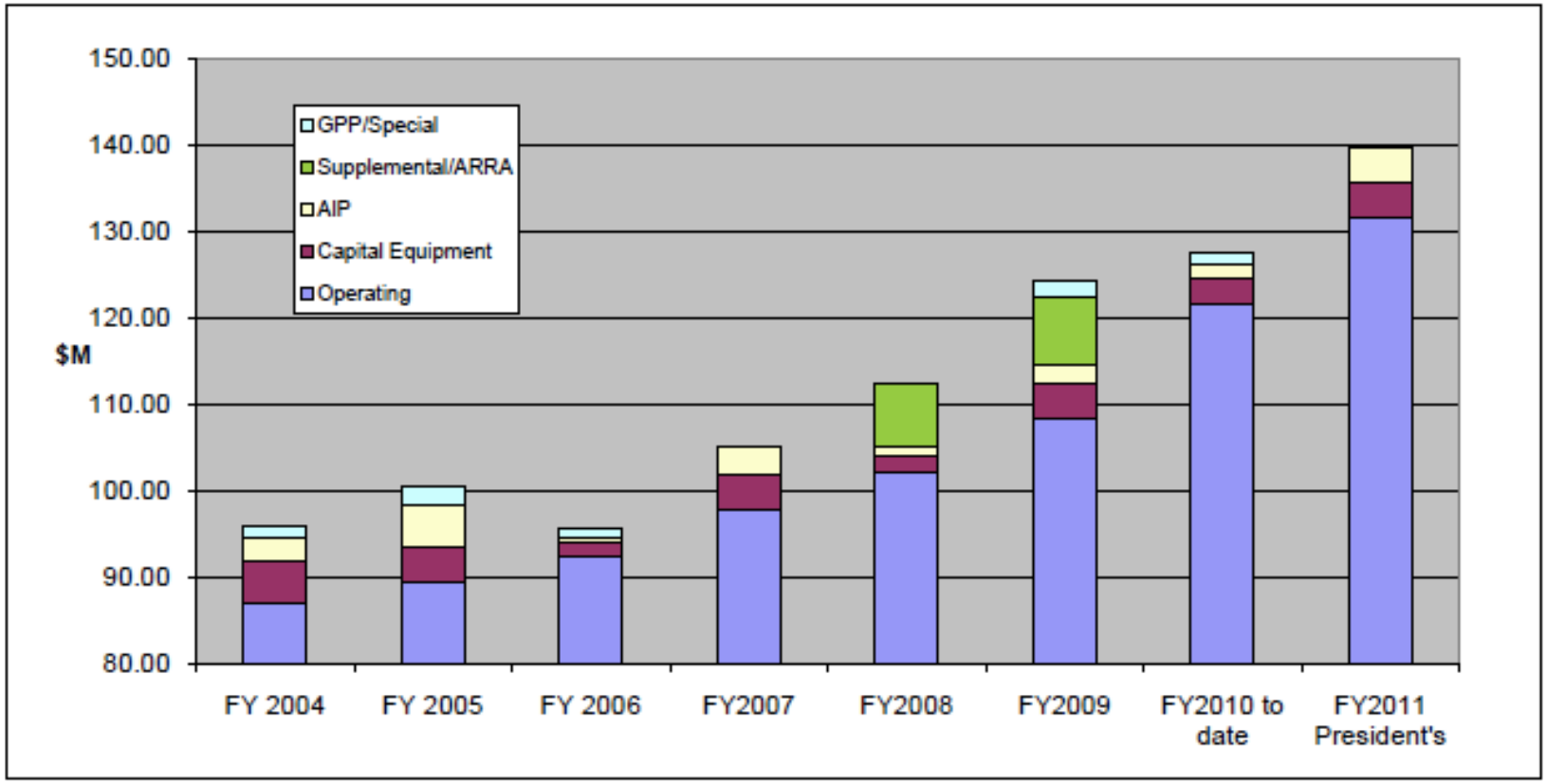
- Transport of hazardous research samples in ANL employees personal vehicles is not permitted
- Currently can request transport by service groups using ANL vehicles
- We are looking into providing a laboratory vehicle for use by ANL researchers in transporting hazardous samples that qualify
  - One vehicle has been identified, others may be procured
  - We are identifying where these will be located to best serve the needs of the research community
  - There are some materials for which transport must be done by an ANL service group such as Materials Control & Accountability (MC&A) for radioactive materials

Budget and SAC

- Operating under Continuing Resolution
  - Planning for various scenarios
- Recent SAC Meeting
  - Carried out cross-cut review of Interface Science
  - Agreed to lead Scientific Review of components of APS-U

APS Ops Budget History

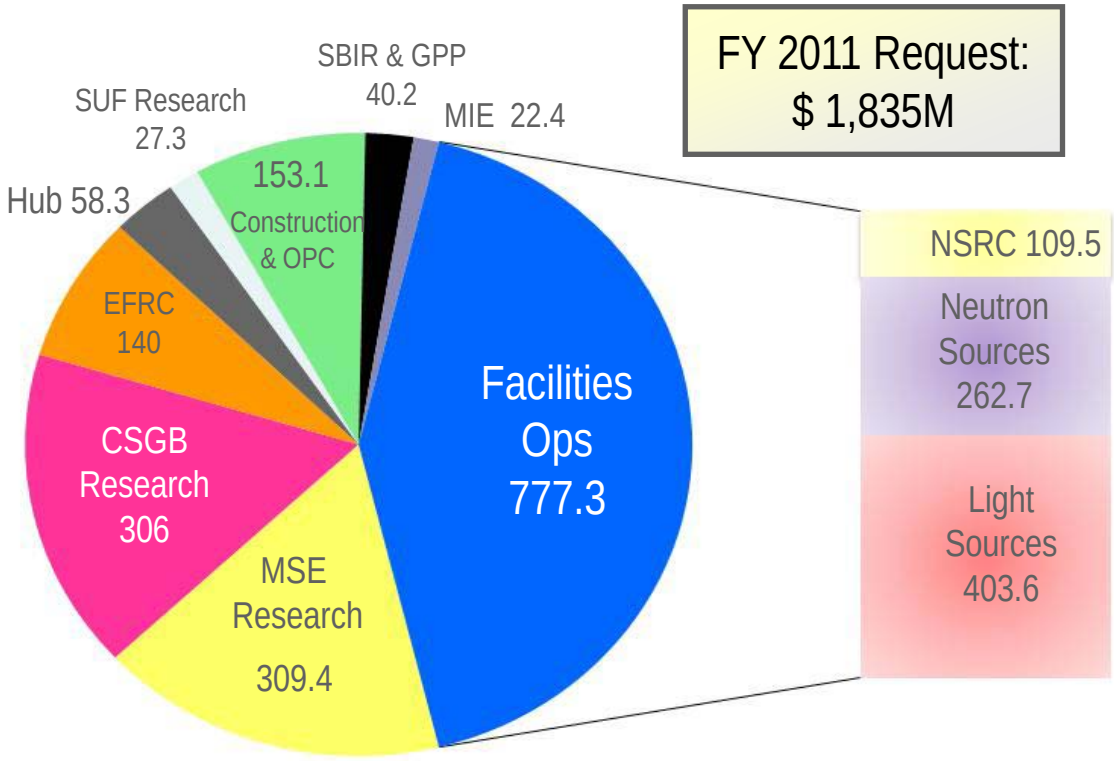
- In FY10 we received $128M; FY11 President's request $139M



- We will make our plans for FY11 assuming a 6 month CR, but should be in relatively good shape as our carry-over from FY10 will be > $10M.

FY 2011 BES Budget Request

- Research programs
  - Energy Innovation Hubs
  - Energy Frontier Research Centers
  - Core research increases for grand challenge science, use-inspired science, accelerator & detector research
- Scientific user facilities operations
  - Synchrotron light sources
  - Neutron scattering facilities
  - Nanoscale Science Research Centers



- Construction and instrumentation
  - National Synchrotron Light Source-II
  - Spallation Neutron Source instruments
  - SNS Power Upgrade

Harriet Kung BESAC August 5, 2010

Status of FY 2011 Budget Request and Appropriations

(dollars in thousands)

	FY 2010	Total Recovery Act	FY 2011						
	Current Approp.		FY 2011 Request to Congress	House Mark	House Mark vs. Request		Senate Mark	Senate Mark vs. Request	
Office of Science									
Advanced Scientific Computing Research	394,000	+161,795	426,000				418,000	-8,000	-1.9%
Basic Energy Sciences	1,636,500	+555,406	1,835,000	1,670,618			1,739,115	-95,885	-5.2%
Biological & Environmental Research	604,182	+165,653	626,900				614,500	-12,400	-2.0%
Fusion Energy Sciences	426,000	+91,023	380,000				384,000	+4,000	+1.1%
High Energy Physics	810,483	+232,390	829,000				820,085	-8,915	-1.1%
Nuclear Physics	535,000	+154,800	562,000				554,000	-8,000	-1.4%
Workforce Development for Teachers & Scientists	20,678	+12,500	35,600				21,000	-14,600	-41.0%
Science Laboratories Infrastructure	127,600	+199,114	126,000				126,000	——	——
Safeguards & Security	83,000	——	86,500				86,500	——	——
Science Program Direction	189,377	+4,600	214,437				208,000	-6,437	-3.0%
Small Business Innovation Research/Tech. Transfer (SC)	107,351	+18,719	——				——	——	——
Subtotal, Science	4,934,171	+1,596,000	5,121,437	4,881,650	-239,787	-4.7%	4,971,200	-150,237	-2.9%
Earmarks	76,890	——	——	18,350	+18,350	——	40,800	+40,800	——
Small Business Innovation Research/Tech. Transfer (DOE)	60,176	+72,775	——	——	——	——	——	——	——
Total, Science	5,071,237	+1,668,775	5,121,437	4,900,000	-221,437	-4.3%	5,012,000	-109,437	-2.1%

Bill Brinkman BESAC August 5, 2010

FY 2011 BES Appropriations

Both Marks provide full funding for construction activities & allow for near optimal operations of scientific user facilities. They differ significantly on EPSCoR and Hub, and leave very limited funding (SEWD) to no funding (HEWD) for the proposed new research activities.

Both Marks keep BES off the budget doubling track.

Harriet Kung BESAC August 5, 2010

Opportunity for advocacy

Need concise examples of impact of APS

Cross-Cut Review of Interface and Liquid Surface Scattering Science

Charge to committee:

- Assess the quality of science in these areas (hard surfaces and interfaces, liquid surface scattering, soft interfaces, etc.) at the APS.
- Provide advice on the optimum level of support (beamlines, instrumentation, time available, staffing).
- Assess the APS upgrade plans as related to these areas of science to determine if they are appropriate, i.e. sufficient. Comment on current priorities or, if needed, prioritize options.

Review Panel Membership

▪ Friso van der Veen, SAC, Chair	*Paul Scherrer Institut*
▪ Pulak Dutta	*Northwestern University*
▪ Jeff Kortright	*Lawrence Berkeley National Laboratory*
▪ Ka Yee Lee, SAC	*The University of Chicago*
▪ Dan Neumann, SAC	*National Institute of Standards and Technology*
▪ Chris Palmstrom	*University of California, Santa Barbara*
▪ Eliot Specht	*Oak Ridge National Laboratory*
▪ William Stirling	*European Synchrotron Radiation Facility*
▪ Tom Irving	*Illinois Institute of Technology*
APS Partner User Council, *ex-officio*	
▪ David Tiede	*Argonne National Laboratory*
APS Users Organization, *ex-officio*	

Agenda

October 6-7, 2010
Bldg. 402 Auditorium and Gallery

- Overview of Interface Science Capabilities: Current and Proposed
  Paul Zschack, X-ray Science Division, APS
- Quantum and Atomistic Effects in Thin Film Growth
  Tai-chang Chiang, University of Illinois at Urbana-Champaign
- Synthesis and Processing of Energy Related Materials and Structures
  Paul Fuoss, Materials Science Division, ANL
- Imaging Structure and Reactivity at the Liquid-Solid Interface
  Paul Fenter, Chemical Sciences and Engineering Division, ANL
- Why add in-situ Oxide MBE to the APS?
  Darrell G Schlom, Cornell University

Agenda

- Overview of Liquid Surface Scattering Science at the APS/Review of 8/2/10 LSS Workshop at the APS

  Mark Schlossman, University of Illinois at Chicago

- LSS: From Biomolecular Materials to Structural Biology

  J. Kent Blasie, University of Pennsylvania

- X-ray Studies of Liquid Surfaces: From Liquid Metals to Langmuir Monolayers

  Oleg Shpyrko, University of California at San Diego

- **Poster Session (over 90 Contributed posters)**

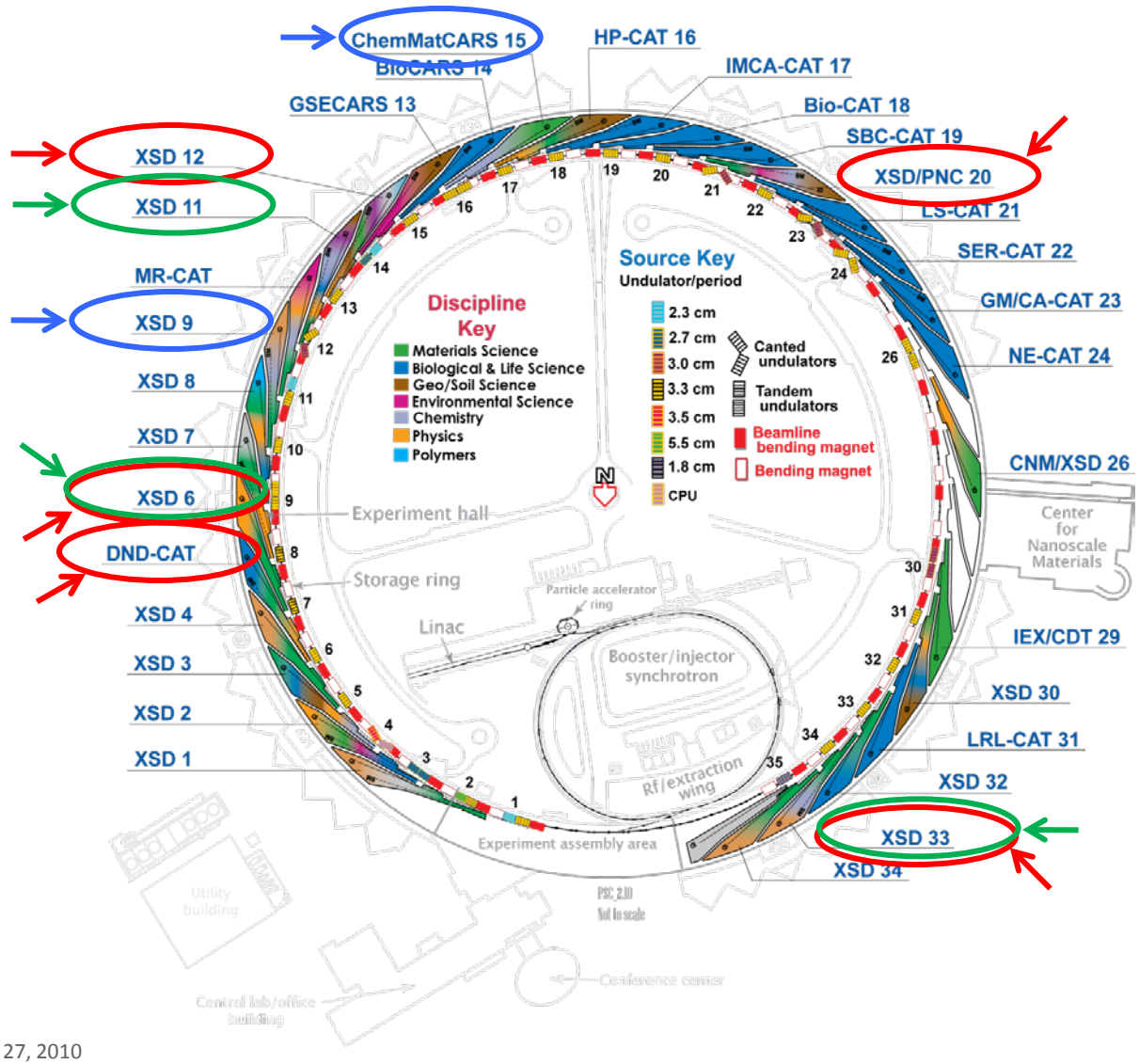
Beamlines for Interface Science at APS - Today

Presently, interface science activities are distributed to several APS sectors

Liquid Surface Scattering
9-ID, 15-ID

Ex-situ Interface Studies
6-ID, 11-ID, 33-ID, 33-BM

Growth Chambers (*in-situ studies*)5-ID, 6-ID, 12-ID, 20-ID, 33-ID



Interface Science at APS – Related Facilities

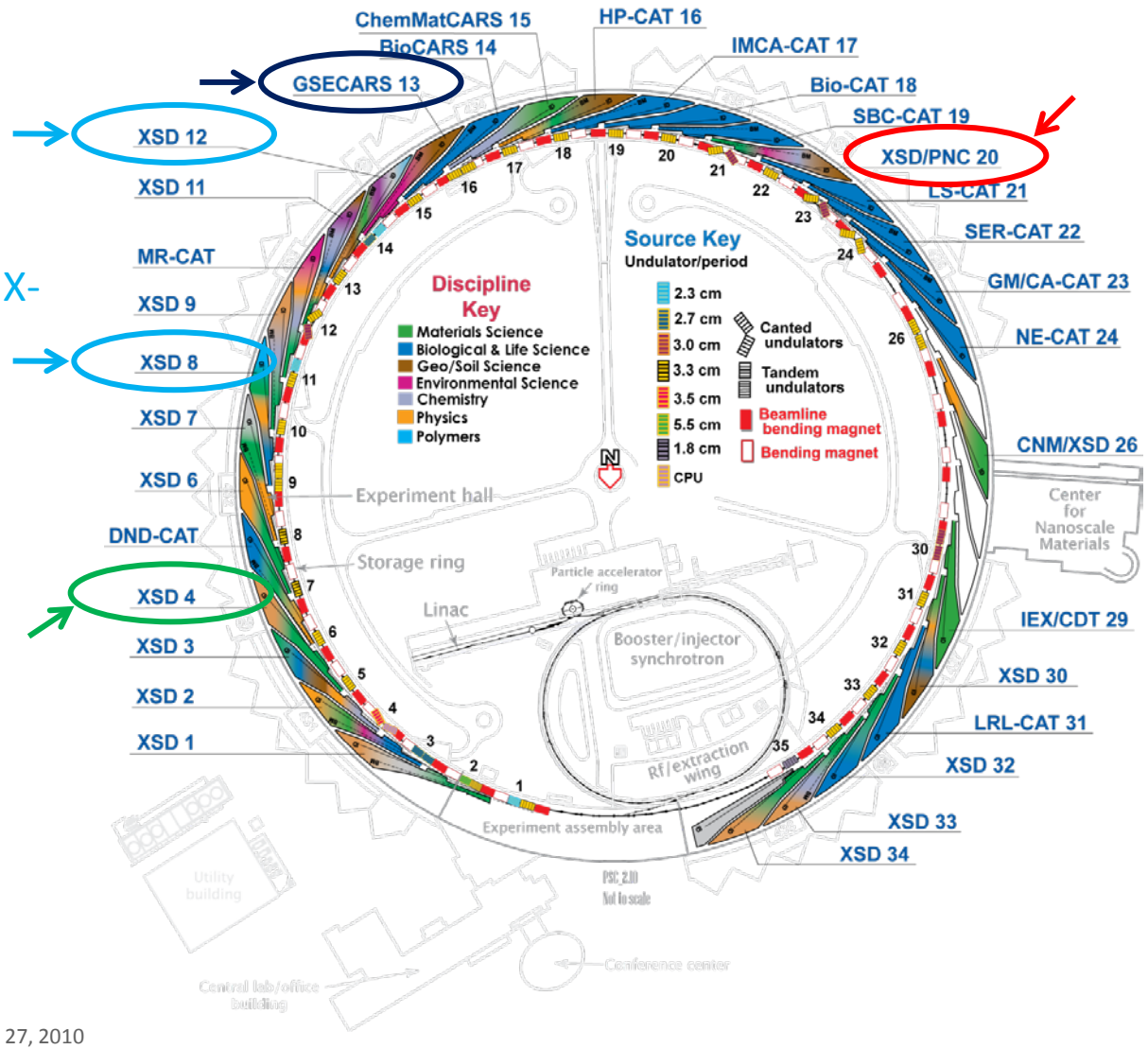
Additional interface science activities distributed at several APS sectors

Grazing Incidence Small-Angle X-ray Scattering 8ID, 12ID

Interfacial Magnetism 4ID

Surface/Interface Diffraction 13ID

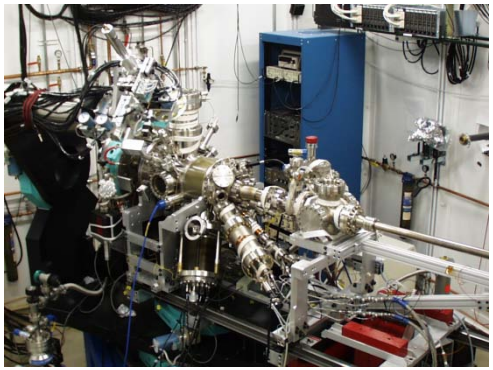
Surface Spectroscopy 20ID



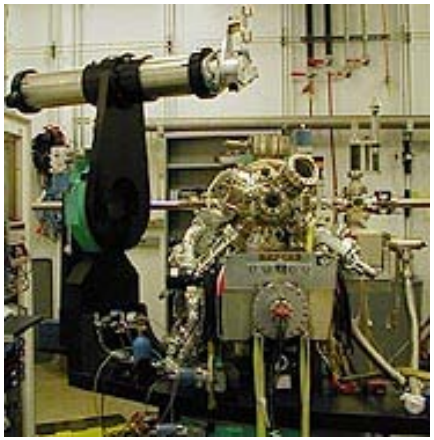
Surface & Interface Science Activities at APS Today

- Interfacial Magnetism (4-ID)
- XSW (5-ID, 33BM, 33-ID)
- Surface Diffraction (5-ID, 6-ID, 11-ID, 12-ID, 13-ID, 33-ID)
- Reflectivity (5-ID, 8-ID, 12-BM, 33-BM)
- Liquid Surface Scattering (9-ID, 15-ID)
- GISAXS (8-ID, 12-ID)
- MOCVD (12-ID), PLD (33-ID)
- Surface XAFS (20-ID)

- Large, dispersed user community
- Many facilities under-utilized
  - (timeshare with other techniques)
- Conflicts with upgrade plans in some areas



6 ID-C UHV surface scattering chamber



5 ID-C surface science chamber and diffractometer

Potential Upgrade Components for "Interfaces in Complex Systems"

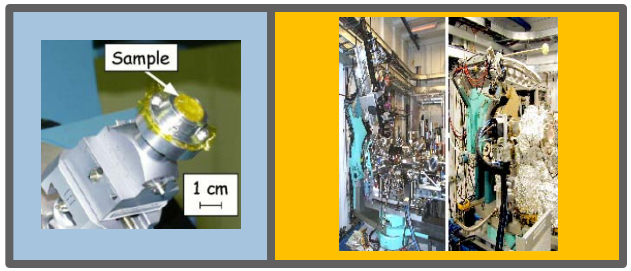
- X-Ray Interface Science – ID Beamlines (28-ID)
  - One fully tunable canted Undulator beamline (4-40 KeV)
  - Fixed-energy Undulator beamlines – 3 branches: 10 keV, 30 keV, 30 keV
- X-Ray Interface Science – BM Beamline (28-BM)
  - Widely tunable beamline (5-35 KeV) for interface diffraction and spectroscopy
- Liquid Surface Scattering – ID Beamline
  - Dedicated liquid surface spectrometer on a tunable (3.5-30 KeV) ID beamline
  - Canted ID beamline to provide new dedicated liquid surface scattering instrument
- Expanded Resonant Interface Scattering (33-ID)
  - New optics and expanded hutch for robust resonant interface scattering
  - Canted ID beam line to provide independent operations of 33-ID-D and 33-ID-E
- Other activities related to "Interfaces in Complex Systems":
  - Interfacial Magnetism (4-ID), High-energy Interface Diffraction (13-ID), GISAXS (8-ID, 12-ID), Surface Spectroscopy (20-ID)

X-Ray Interface Science Sector & Instruments

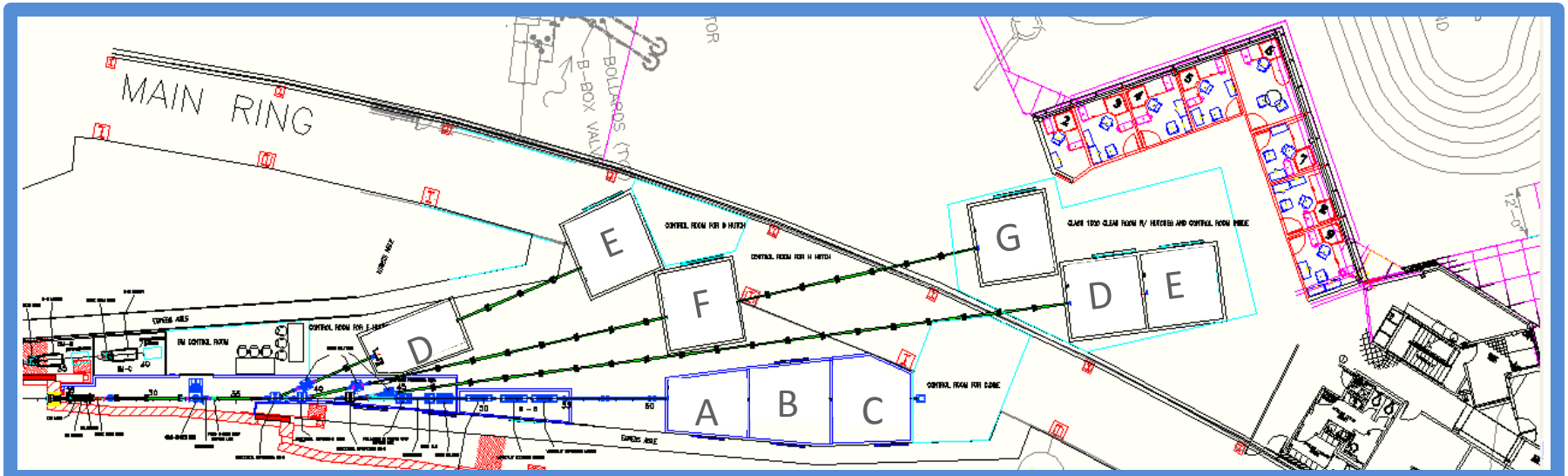
A. Complex Gas-Phase Environments
B. X-Ray Reflection Interface Microscopy
C. Oxide MBE
D. General-purpose interface diffraction
E. Growth chambers (MOCVD, ALD, PLD)
F. Liquid Phase environments
G. Ultra-high Vacuum Science
H. XAFS/XANES - BM
I. Resonant Scattering – A, B, C

Facilities:

- Specialized end-stations available off-line
- Environmental Cells attach to General Diffractometers



Tandem Hutch Design



Schematic layout of the XIS Sector at 28-ID

Informal SAC Feedback (report expected soon)

- XIS and LSS – hold prominent place in existing configuration of APS; expansion of activities during the years; anticipated growth
- Committee members impressed with presentations and documentation.
- Anticipate a positive report on science quality
- For each beamline, staffing considerations are important.
- Detailed discussions on uniqueness, need to make maximum use of APS cutting-edge capabilities (hard x-rays, energy tunability, etc.).
- Committee was impressed by enthusiasm of poster presenters and participation
- Concerning upgrade:
  - XIS Sector proposal is viewed favorably– maintaining some activities at other sectors.
  - LSS provided a strong science case – challenging to incorporate into APS-U.

APS Upgrade Scientific Review Process Developed

- APS Scientific Advisory Committee agreed to review/prioritize potential Upgrade components by early 2011
- Currently have about 30 beamline/upgrade projects
- Review criteria defined
  - Scientific/technology excellence, societal relevance, unique match to APS capabilities, user community impact, technical feasibility
- Scientific case documents will be prepared by teams of users
- Will be reviewed by five subpanels of SAC, with additional experts
- SAC will also review overarching components (e.g. detectors, stability, higher current)

Questions?
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