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# *Progress Report on the 9BM upgrade project*

*Steve Heald*

# *The beginning*

**Workshop on Catalysis Research at the Advanced Photon Source Report**

**Workshop held at the Advanced Photon Source**
**Argonne National Laboratory on September 12-13, 2005**

Organizers:

Simon Bare UOP LCC
Steve Heald PNNL
Chris Marshall ANL
Peter Stair Northwestern University
Hoydoo You ANL
Randall Winans ANL

82 participants from Nat. labs, Universities and Industries
Included synchrotron users and non-users

# *Key Recommendations*

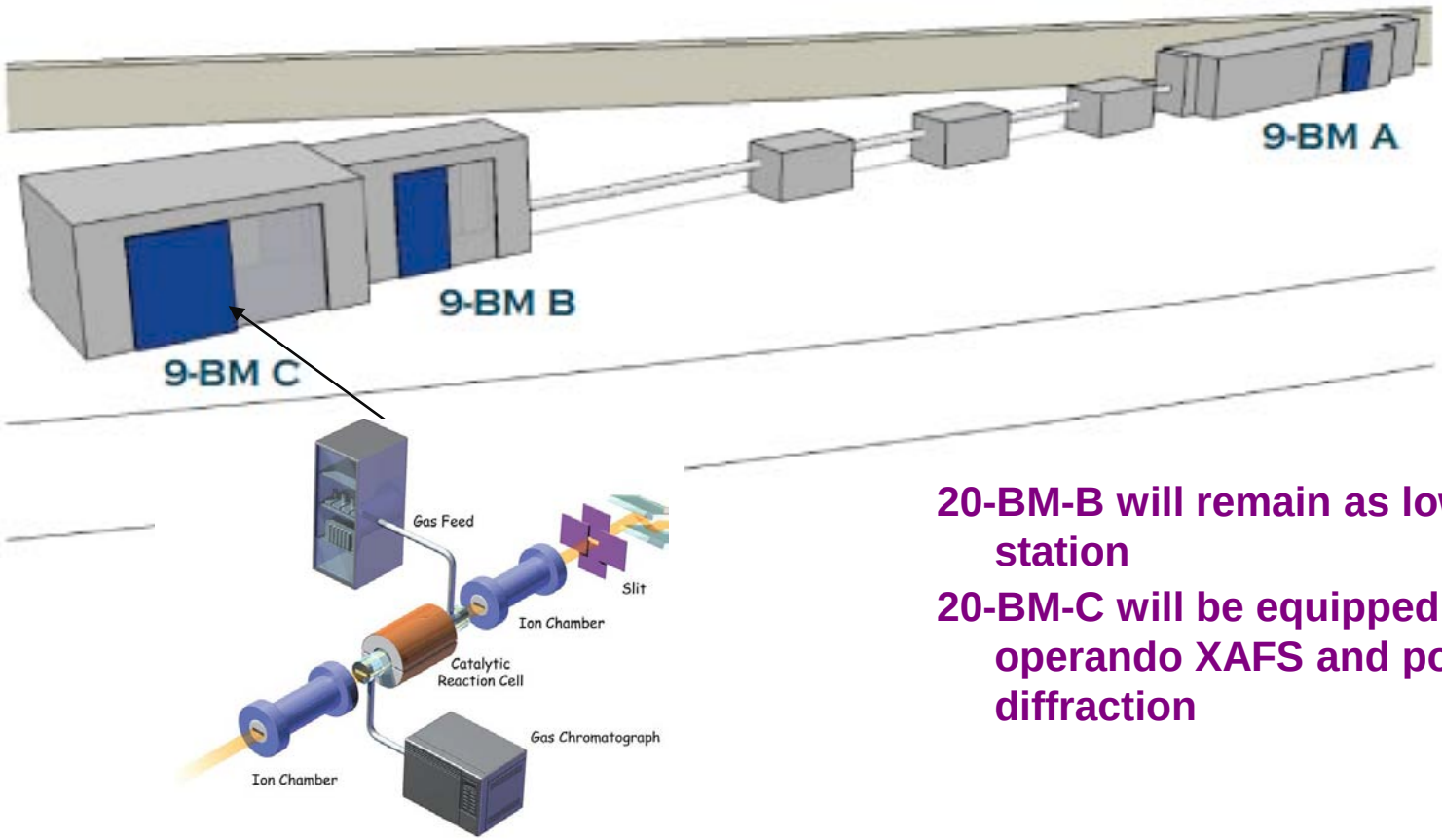
- APS should establish one bending magnet beamline for catalyst research, designed to perform concurrent XAS/XRD measurements
- The APS should provide the facilities infrastructure needed to allow measurements under the wide range of reaction conditions employed in catalysis. This infrastructure should preferably be available on both catalysis specific and dedicated-technique beamlines
- APS should provide appropriate, beamline-science staff, specializing in catalysis research. They would serve as facilitators to use of ID lines.

# *Progress so far*

- Mid-term upgrade proposal for “Catalyst Center at 9BM”
- Commitment from APS for additional beamline scientist at 9BM
  - FY2010 ?
- LDRD for 9BM upgrade – successful!
- Argonne EFRC proposal for catalysis – successful!

# 9BM Beamline

- 9-BM is currently dedicated to XAFS.
- Optimized for data collection below 5 keV but can reach energies as high as 22 keV.
- Beamline operates routinely at energies as low as 2.5 keV. Has the ability to operate at 2.1 keV




**20-BM-B will remain as low-E station**

**20-BM-C will be equipped for operando XAFS and powder diffraction**

# *LDRD proposal*

- Beamline upgrades
  - Instrument 9-BM-C for higher energy (>5-6 keV) operando operation
  - Fast scanning monochromator
- Detector upgrades
  - New multi-element detector
  - Area detector for diffraction
- In-situ capabilities
  - Gas handling
  - On-line sample monitoring (mass spec etc)
- Enhanced laboratory capabilities (glove box etc)
- Post-doc

**Request: 500k/yr for 3 years**

**Actual: 750k total over 2 years**

# *Revised project*

- No new fast scanning mono – upgrade current mono
- No new detectors
  - Borrow area detectors from detector pool
  - Use surplus 13-element Ge detector from sector 20
- Retain most of the catalyst *in-situ* and sample preparation capabilities

Year one: prepare 9-BM-C for user operation with basic catalyst prep equipment and gas handling capabilities

Year two: upgrade mono and build up in-situ and sample preparation capabilities

# *Future*

- Revisit APS renewal proposal
- Catsync similar to HPsync?