Sector 4 orientation:
4-ID beamlines and laboratories

Magnetic Materials Group,
X-ray Science Division

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4-ID Orientation Outline

- Section-1:
  - General Safety/Emergency
- Section-2:
  - Beamline-specific information
- Section-3:
  - Other hazards: Electrical safety, pressurized systems, cryogenics, high magnetic fields

- In-person orientation needed for,
  - Beamline search process
  - Special equipment (magnet, laser…)
  - Cryogenics
  - Gas cylinder exchange
  - Sample change

“Safety first” and “Stop authority”

- Safety First:
  - No work is so important that it needs to be done without assuring proper safety measures in place.

- Stop Authority:
  - If you see work or actions that may put you or others at risk, you have the responsibility to stop the work and bring the situation to the immediate attention of your local contact and/or the floor coordinator.

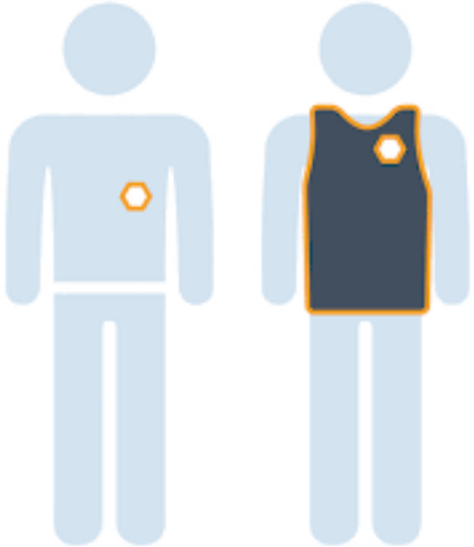
Emergencies

- In case of an emergency,
  - Dial 911 using an ANL phone
  - Dial 630-252-1911 using a cell phone
- Emergencies include: Injuries, Fire, Water leaks, Electrical shock, Laser exposure
- If possible, have someone available to direct emergency personnel to the exact location.
- Tornado shelters for the Sector 4 area are men's and women's restrooms.
- When a fire alarm goes off, you should immediately evacuate the building.
- If required to evacuate the building, the assembly point for Sector 4 occupants is outside of LOM Bldg 434 (sectors 13-16)

Dosimeter requirements

- All personnel on the APS Experiment Hall floor are required to wear a dosimeter. The dosimeter must be worn on the torso midway between the neck and waist.

- Dosimeters are not required in the laboratory office modules



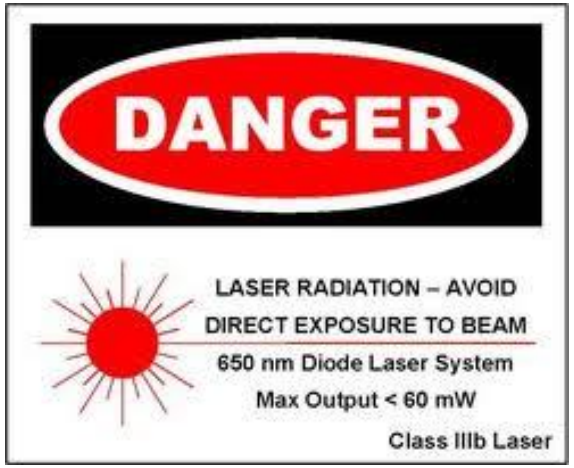
Safety equipment

- A Class ABC Fire extinguisher, is located by the 4-ID-XTIP room across column 76

- A shower/eyewash station is located in lab 431-E030.

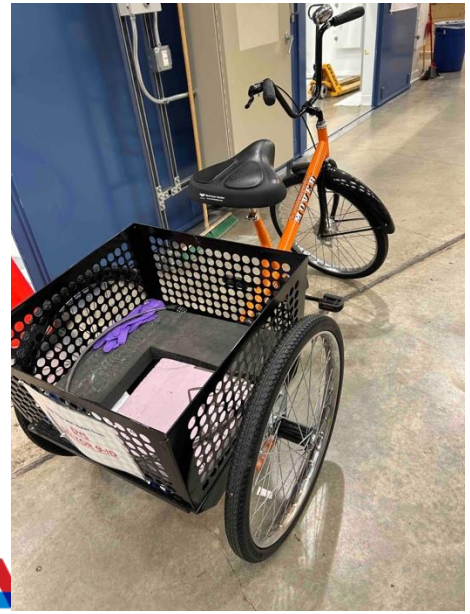
Restricted Areas

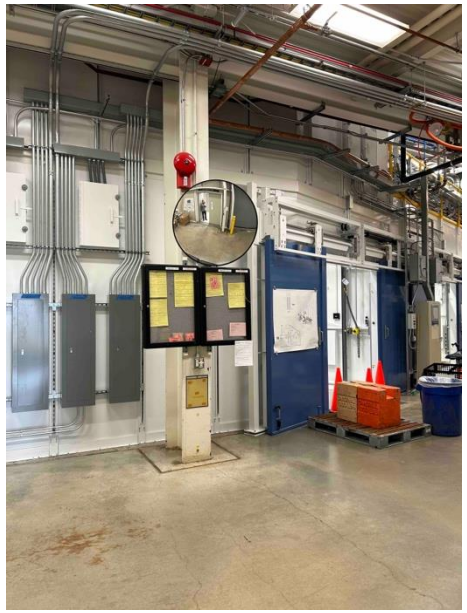
- At sector 4, you may encounter restricted access areas, such as laser and magnet enclosures.
- To enter these areas, you must have the required training and authorization. You must follow all posted entry requirements.



Pedestrians and tricycles

- Pedestrians in the experiment hall share the walkways with a variety of motorized/moving vehicles (e.g., forklifts, scissor lifts, and tricycles).
- Pedestrians must exercise caution and look in both directions before stepping into a walkway from the laboratory/office modules (LOM) or beamline areas. Mirrors are located across exits from LOM and BL areas areas





Working alone

- When your activities involve significant hazards, you are not permitted to work alone.
- If you will be working alone conducting non-hazardous activities, it is good practice to inform your local contact that you will be doing so.

Enclosure (hutch) doors

- You are not allowed to be inside an experiment station (“hutch”) with the doors closed.
- If you find yourself inside a locked station you can deactivate shutter permit (Emergency beam stop box) and open the pneumatically actuated doors (door control box) by depressing emergency buttons located along the wall.

Searching enclosures

- A "Search and Secure" must be conducted before beam will be allowed into an experimental station/enclosure
- This process requires pressing more than one search button distributed inside the enclosure, ensuring nobody is left inside before beam is allowed into the station
- Only ONE person can conduct a search and secure at a time.
- You will be taught how to conduct a Search and Secure by a beamline representative.

Radiation Safety Tags

- Configuration controls serve to protect personnel from radiation exposure.
- These components are marked by yellow tags and MUST NOT be moved or modified.

Personnel Safety System (PSS)

- The PSS is the interface to the beamline x-ray shutters and active shielding components (hutch doors).
- Each experiment station has a PSS screen allowing you to control shutters (open/close) in the Sector's experiment stations.
- Note that accidentally knocking the user enable key out of position will disable shutter operation.
- PSS faults have to be cleared by the Floor coordinator.

Equipment Protection System (EPS)

- The EPS system monitors beamline vacuum, water flows, temperatures, and gate valve positions.
- Vacuum gate valves are controlled within this system.
- EPS failures such as vacuum or water trips are handled by your local contact.

Hoisting and Rigging

- The 4-ID-B and 4-ID-G hutches are equipped with 1 Ton bridge cranes while 4-ID-H has both 1 Ton and 2 Ton cranes
- You may use the hoist located in 4-ID beamlines, only after completing APS Chain fall Hoist Training (APS21111).
- Safety shoes, safety glasses, hard hat and work gloves are required to use the chain fall hoist.

Electrical equipment

- You are NOT allowed to use electrical equipment that has not undergone inspection by a Nationally Recognized Testing Laboratory (NRTL) or an ANL/APS Designated Electrical Equipment Inspector (DEEI).
- If you plan to bring custom-made electronics or electrical equipment that has not been inspected and tagged by an NRTL, please ship your equipment AHEAD OF YOUR EXPERIMENT and have your local contact coordinate an inspection with an APS/DEEI.
- The following activities are prohibited:
  - Rewiring of plugs, cables, or any other electrical equipment,
  - Connecting and Disconnecting motor cables with power on,
  - Switching on/off the beamline circuit breakers.

Gas Cylinders

- Before changing gas cylinders, in-person training from your local contact is necessary.
- Gas cylinders are stored in the gas yard between sectors 4 and 5.
- The key for the gas storage locker is located in a key box in LOM laboratory E020.

Radioactive Samples

- Restrictions apply for,
  - shipping samples in and out of APS,
  - sample containment during experiment,
  - sample access during experiment,
  - and unattended experiments off hours.

You must talk to your beamline contact and/or APS floor coordinators if you are planning on measuring radioactive samples at the APS

Sample Preparation Facilities

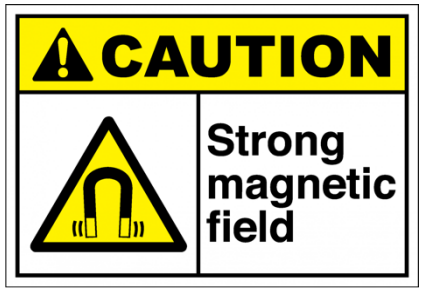
- Located in sector 4 wet lab 431/E030
- Users are responsible for cleaning up sample preparation area and all tools used.
- It is your responsibility to remove samples from the facility at the end of your experiment and to label any chemical waste generated.

Cryogens safety

- A LN2 filling station is located in the truck-lock area across from 4-ID-H enclosure
- You must wear proper personal protection equipment (PPE) to operate the LN2 filling station (face Shield, long sleeve gloves, apron)
- You must also wear proper PPE to transfer LHe into cryogenic magnets.
- When filling cryogens inside the enclosure, the enclosure doors must remain open.
- The 4-ID-H station, which houses a cryogenic magnet, uses an oxygen monitor to ensure proper oxygen levels. If it alarms, you must notify your beamline contact and the floor coordinator
- If the oxygen monitor alarms, personnel shall not enter the hutch

High Magnetic field safety

- Magnetic fields are present in all experimental enclosures
- Magnets generating fields up to 2 Tesla are located at 4-ID-B and 4-ID-G stations, while 4 Tesla and 9 Tesla magnets are located at 4-ID-H
- Extreme care is needed to ensure that no metallic tools are left in the vicinity of the magnets before they are energized. This include the chain fall hoist attached to bridge cranes
- Sample changes in magnets should never be done while magnets are energized
- Superconducting magnets have “persistent” modes. Beware that magnetic field can be present even with no current in the power supply !



Off Hours Support

- Between 10:00 pm and 6:00 am, only urgent support calls to your local contact.
- Floor coordinators are on site until 10:00 pm and can be paged at 2-0101.

- Additional information on 4ID beamline capabilities is available at http//www.aps.anl.gov/Sectors/Sector4/home/