Experiment No.:

ALS EXPERIMENT FORM

[Please print or type]

EXPERIMENT:

Experiment/Proposal Number:	
Title of Experiment:	
Beamline/Branchline/End station:	
Expected start date of experiment:	Day: Month: Year:
Date of completion of this form:	
Person completing this form:	

EXPERIMENTER IN CHARGE:

Name:		Signature:
Affiliation:		
Address:		
Phone:		
Local Address:		E-mail address:
Local Phone:		Fax No.:

BRIEF DESCRIPTION OF EXPERIMENT (purpose, apparatus):

SAMPLE ONLY EXPERIMENT: Yes ☐ No ☐

Are you bring any equipment with you? Yes ☐ No ☐

"No" (complete pages 1, 2, and 4)

"Yes" (complete entire form)

BEAMLINE MODIFICATION:

Is modification to an existing beamline necessary? Yes ☐ No ☐

SCHEMATIC DIAGRAM OF EXPERIMENTAL APPARATUS

If you are bringing your own equipment or endstation, please fax a schematic of your experiment setup to the User Office at (510) 486-4773. The schematic can be hand drawn (see example on page 11 for level of detail necessary). It should include the following:

- vacuum chambers
- vacuum pumps and valves
- vacuum viewports
- pressure or vacuum gauges
- up-to-air or venting arrangements
- gas cells and their thin windows or differential pumping arrangements
- gas delivery systems
- high-voltage feed-throughs and internal high-voltage connections
- water, gas, or cryogenic cooling circuits
- movable rotating parts
- other important features in terms of safety and vacuum integrity
- experiment/proposal number noted on schematic

Experiment No.:

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Please provide the following information for all **EXPERIMENTERS:**

Name	Affiliation	Phone	Local Phone

ALS EXPERIMENT FORM

SAFETY CHECKLIST

Please review the section headings below and place a check mark beside each category which applies to your experiment equipment and/or materials.

Note: All experiment equipment brought to the ALS must comply with ALS and Berkeley Lab safety requirements before it will be allowed to operate at the ALS. These requirements are detailed in the documents found in the "Essential Information" section of each of the following pages.

☐ Materials

☐ Class 3b and 4 Lasers

☐ Power Supplies and Other Potential Electrical Hazards: High Voltage (>50V **and** >5mA), RF, and Microwave

☐ Vacuum Chambers

☐ Gas Systems

☐ Radioactive Materials, X-Rays, and Hutches

☐ Other Hazards, including
- Sources of Significant Noise, Vibration, or Radio Frequency Interference
- High Temperature Components (other than heater tapes used for bake-outs)
- Rotating or Motorized Equipment

Seismic Requirement

Most experiment equipment installed at the ALS must be restrained (usually by bolting to the floor) to resist earthquake forces. For information on bolting and safety requirements, see ALS User Advisory 4*: Guidelines for Meeting Seismic Requirements for User Equipment at the ALS

*Advisories are available on the web at **http://www-als.lbl.gov/als/user-advis/user_advis_index.html**

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MATERIALS

- Only small quantities of hazardous substances are allowed on the ALS experiment floor and all hazardous materials must be in approved containers. In addition, only limited storage space for hazardous materials is available; please bring the smallest quantity possible.
- Shipment and transfer of hazardous materials will be via approved carriers only. Transportation of hazardous materials by personal or Lab vehicle is prohibited.

ESSENTIAL INFORMATION:

ALS User Advisory 11: ALS Chemistry Laboratory — Facilities and Safety Requirements
ALS User Advisory 15: The Use of Toxic and Corrosive Gases at ALS Endstations

ADDITIONAL REFERENCES:

PUB 3000, Chapter 20: Hazardous Waste Disposal
PUB 3000, Chapter 21: Radiation Safety

ACTION: List all materials planned for use in this experiment. Include samples (targets), chemical solvents, and biological materials.

Materials	Amount	Solid, Liquid, or Gas

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LASERS: CLASS 3B AND CLASS 4

- LBNL laser safety training and eye examinations will be required for personnel using class 3b and class 4 lasers (documentation must be provided). If you have had a laser eye exam in the past year, it may satisfy LBNL medical surveillance requirements; use the Non-LBNL Eye Exam Form, available in the User Services Office, for evaluation of your exam.
- Special safety requirements, depending on the class of the laser and whether the radiation is visible or invisible, are described in Chapter 16 of PUB 3000 (see below).

ESSENTIAL INFORMATION:

ALS User Advisory 6: Laser Safety Policies for Class 3b and Class 4 Lasers
PUB 3000, Chapter 16: Lasers

ACTION: List laser(s) to be used in this experiment.

Type	Power	Pulsed/CW	Class	Brand/Model

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POWER SUPPLIES AND OTHER ELECTRICAL HAZARDS: HIGH VOLTAGE (>50V AND >5MA), RF, AND MICROWAVE POWER SUPPLIES

- High-voltage power supplies can pose obvious hazards to personnel and sensitive equipment. In some cases (i.e. microwave, RF, high-voltage power supplies), radiation in the form of x-rays may be produced. To avoid hazardous conditions, current should be limited to low values whenever possible.

- To conform to Berkeley Lab's stringent electrical safety requirements, special enclosures, signs, warning devices and/or interlocks may be required, along with training and Activity Hazard Documents (AHDs). LBNL electrical safety rules are discussed in Chapter 8 of PUB-3000.

- Electrical systems within a vacuum chamber, particularly those that include the use of high voltage (>50V) power supplies (or equivalent in batteries) or any floating power sources, may require a more detailed safety inspection. Be prepared to provide a simple wiring diagram of these systems at the time of your experiment safety review.

ESSENTIAL INFORMATION:

ALS User Advisory 3: Avoiding Overloads on AC Circuits
ALS User Advisory 5: Beamline Electrical Safety Guidelines
PUB 3000, Chapter 8: Electrical Safety

ACTION: List power supplies and electrical equipment to be used in this experiment.

Type of Supply/Manufacturer. Model	Maximum Voltage	Maximum Current

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VACUUM CHAMBERS

- The integrity of experiment endstations brought to the ALS is a concern because their vacuum chambers usually communicate directly with the ALS storage ring. Endstations must operate under UHV conditions or be isolated from the beamline to avoid contamination of the beamline and/or storage ring. Commercially designed and fabricated stainless steel vacuum chambers are generally acceptable for use at the ALS. A Residual Gas Analysis (RGA) test of user equipment to assess vacuum quality may be required before opening the chamber to a beamline. Please contact the user vacuum support staff prior to attaching to a beamline.

- **The use of oil-sealed or oil-lubricated vacuum pumps is highly discouraged at the ALS due to the risk of contamination**. In some cases, however, the need for very high pumping speed and/or resistance to corrosive gases may dictate the use of an oil-sealed pump. In these cases, a rigorous safety interlock system must be in place to prevent oil contamination of the beamline and storage ring. For more information, see ALS User Advisory 14.

- Breakage of glass vacuum viewports is a significant hazard. Commercial viewports with apertures of 15 cm (6 in.) or less are acceptable, and may be provided with transparent protective covers by the ALS. Larger, or custom-made viewports must be documented and pressure tested.

NOTE:

- Only unbreakable “nude ion gauge heads are allowed at the ALS. Glass-tube ion gauges are not allowed.
- Gas delivery systems must include a positive means to prevent inadvertent over-pressurization of the vacuum chamber.
- Cooling water to vacuum joints is not allowed..

ESSENTIAL INFORMATION:

ALS User Advisory 9: Vacuum Policy for User Endstations for Protection of Beamline Components
ALS User Advisory 14: Interlock Requirements for Turbo Pump Systems on ALS Endstations
ALS User Advisory 15: The Use of Toxic and Corrosive Gases at ALS Endstations

ADDITIONAL REFERENCES:

Advanced Light Source Vacuum Policy and Vacuum Guidelines for Beamlines and Experiment Endstations
PUB 3000, Chapter 7: Pressure Safety and Cryogenics

ACTION: List all vacuum chambers, approximate volumes, and working vacuum pressures, and answer the following questions.

Chambers	Approximate Volume	Fabrication Source	Working Vacuum Pressure

Are there any viewports which are not standard catalog items of aperture 15 cm or less? Yes ☐ No ☐
Will any part of the system ever experience pressures greater than 3 psi above atmospheric? Yes ☐ No ☐
Will oil-sealed or oil-lubricated vacuum pumps be used? Yes ☐ No ☐

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GAS SYSTEMS

- Gases at low pressures are used in ALS endstations for a variety of purposes, and are usually segregated from the beamline by a thin window or a differential pumping section. Contamination of the beamline and storage ring is a concern, as well as inadvertent pressurization of the experiment chamber and its viewports.

ESSENTIAL INFORMATION:

ALS User Advisory 9: Vacuum Policy for User Endstations for Protection of Beamline Components
ALS User Advisory 15: The Use of Toxic and Corrosive Gases at ALS Endstations

ACTION: List the specifications of the gas system.

Gases to be used and their intended maximum pressures:

Pressure limiting provisions, such as a relief valve, limited source volume, or interlock system:

Thin window material, aperture, and thickness:

Thin window test differential pressure or safety factor:

Differential pumping capacity and pressure ratio:

ALS EXPERIMENT FORM

RADIOACTIVE MATERIALS, X-RAYS, AND HUTCHES (RADIATION HAZARDS)

- The use of radioactive materials, radiation producing equipment (x-ray machines, some high-voltage power supplies, etc.) or vacuum windows may require special procedures, training, handling and storage facilities.

ESSENTIAL INFORMATION:

ALS User Advisory 16: The Use of Radioactive Materials at the ALS
PUB 3000, Chapter 21: Radiaton Safety

ACTION: Answer the questions below regarding the use of x-ray producing equipment, vacuum windows, hutches, and radioactive material.

List x-ray producing equipment:

Will the beam be delivered out through a window? Yes ☐ No ☐
If a hutch will be used, will it need modification? Yes ☐ No ☐

Will radioactive materials be used? Yes ☐ No ☐
If yes, answer these questions [a Radiological Work Authorization (RWA) may be required]:

1. What is the isotope and the level of the daughter radiations?

2. Are there any impurities present? Yes ☐ No ☐ If yes, please describe.

3. How much in (milli, micro, or nano) curies and grams?

4. How is the sample prepared before mounting?

5. How is the sample mounted?

6. How has the sample been tested and certified for integrity and radiation levels?

7. How is the sample prepared in vacuum (e.g., sputtering, annealing, cleaving)?

8. Which endstation and beamline are you going to use and why?

9. Are you going to add anything to the endstation? Yes ☐ No ☐ If yes, please provide a picture/ sketch and description of how it will work, and indicate places where material could be lost.

10. What is the response to loss of sample or vacuum during the experiment?

ALS EXPERIMENT FORM

OTHER HAZARDS

Many kinds of hazards exist in addition to those listed in other sections, e.g.:

- High magnetic fields
- Corrosives
- Explosives
- Environmental contaminants (i.e., discharge to air, soil, water, or waste streams)
- Sources of significant noise, vibration, or radio frequency interference
- High temperature components (other than heater tapes used for bake-outs)
- Rotating or motorized equipment

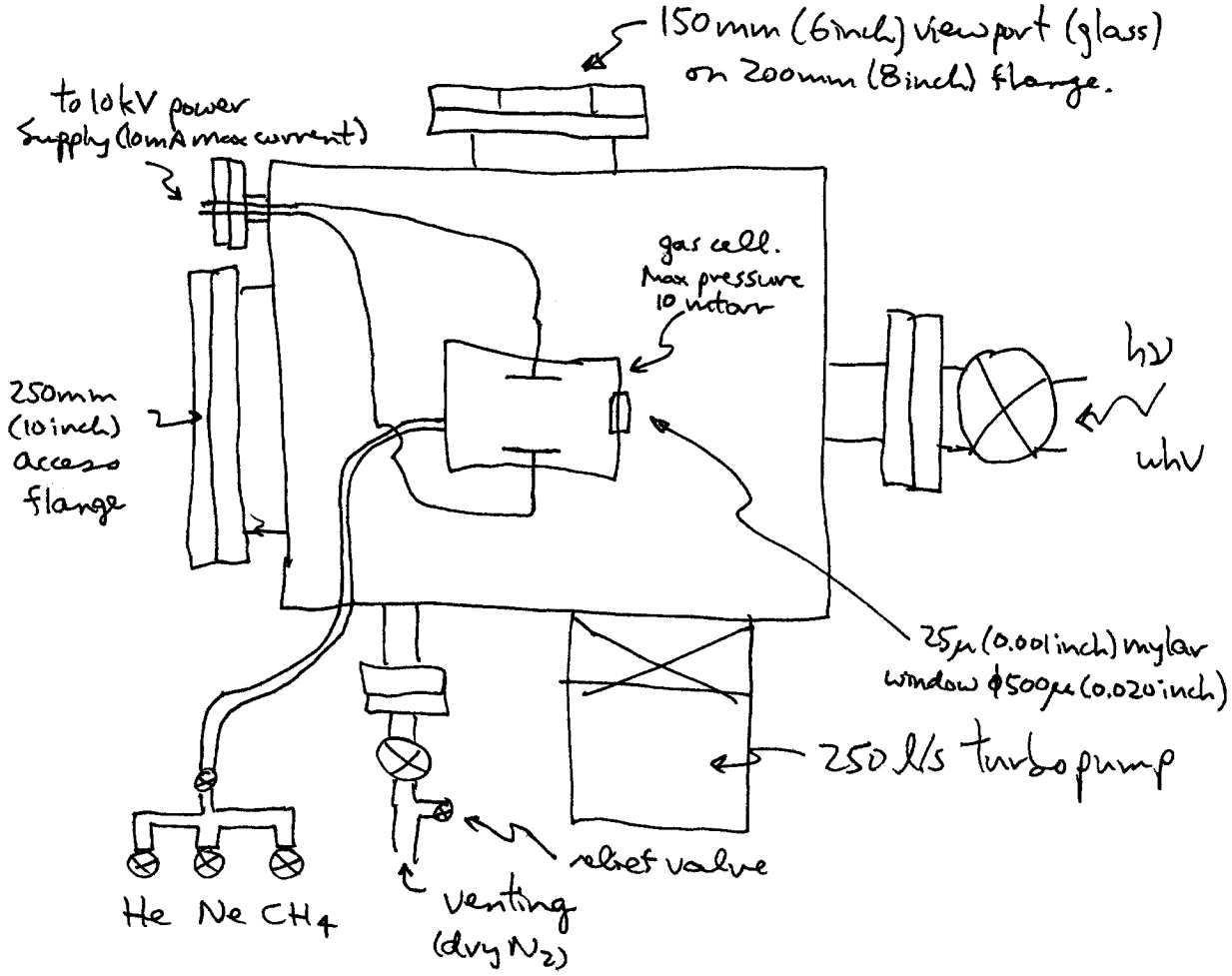
ACTION: List and describe all potential hazards not mentioned in the preceding sections of this form by describing the source of hazard and description of the process.

Source of Hazard	Description of Process

ALS EXPERIMENT FORM

SCHEMATIC DIAGRAM OF EXPERIMENTAL APPARATUS:

Example shows level of detail necessary.



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SCHEMATIC DIAGRAM OF EXPERIMENTAL APPARATUS: