



LAWRENCE BERKELEY NATIONAL LABORATORY
JOB HAZARDS ANALYSIS

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Group: COLTRIMS GUEST (Owner THORSTEN WEBER 800360, Co-owner JEROME J BUCHER 115200)

Description of Work: Preparing and setting up the COLd Target Recoil Ion Momentum Spectroscopy apparatus located in 2-102 in order to conduct experiments at the ALS.

Work locations: building 2, lab 102, and Advanced Light Source

Details: Preparation of gas phase momentum imaging experiments. Setting up as well as maintaining reaction microscopes including the following: soldering electronic components such as voltage dividers and decoupling boxes, cleaning parts and flanges with alcoholic solvents, working with pressurized systems (gas manifold) and cryogenics (LN cold traps) as well as electrical equipment (heating tapes, ion gauges etc.), lifting heavy objects (crane work), construction of vacuum chambers and other ultrahigh vacuum equipment (using hand and portable tools such as drill and heat gun), use of scientific instruments such as oscilloscopes and computers as well as NIM electronics.

Expected output: Ready for use and optimized endstation. Incorporation of new components and prototypes. Successfully performed experiment at the ALS and gain of knowledge in the field of AMO sciences.

| Task # | Description | Hazard(s) | Control(s) |
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| 1 | Safety in General | Procedure for working safely | <p>Perform Integrated Safety Management and follow this 5 step program: 1.) Define scope: What do I want to do? 2.) Analyze hazards: What are the risks of doing it? 3.) Control for hazards: How can I control those risks? 4.) Perform work: Do it (controlling for risks) 5.) Feedback and Improvement: Evaluate performance. How can I do better next time?</p> <p>SEC0201 Computer security: Be aware of your basic security responsibilities and take the necessary actions to protect your computer systems.</p> <p>Agreement of External Computer Monitoring: Information you receive and send out on the internet is subject to monitoring in a DOE government facility.</p> <p>BLI0919 Trafficking Victims Protection: Comply with federal laws enacted to combat trafficking in persons. http://www.lbl.gov/Workplace/Training/TVP/index.html</p> <p>EHS0010 Overview of EHS: Get to know the division that is out there to help you working safely.</p> |
| 2 | Working at heights on ladders | Trips, slips, falls from heights, injuries to persons below from dropped objects | <p>EHS 0278 Ladder Safety Training</p> <p>Inspect ladders for damage and/or broken rungs daily; remove damaged ladders from service</p> <p>Sign, barricade or otherwise guard the area where the ladder is set to assure that others do not disturb or work below ladder.</p> <p>Assure that ladder feet are level and stable</p> <p>Assure that step ladders are fully extended and locked</p> <p>Do not climb higher than the third highest rung on a step ladder</p> <p>Assure that extension ladders are tied off</p> <p>Face the ladder and maintain three-point contact when climbing or descending</p> <p>Keep both hands free (do not carry loads) when climbing or descending</p> <p>Use personal fall protection if you must climb higher than six feet above the ground and are standing on any of the top three rungs of the ladder</p> |
| 3 | Work with cryogenics or on cryogen systems | Skin, eye or inhalation exposure to cryogenic temperatures | <p>EHS 0170 - Cryogen Safety</p> <p>Determine if oxygen deficiency hazard may exist by utilizing the Oxygen Deficiency Calculator in PUB-3000, Chapter 29 (http://www.lbl.gov/ehs/pub3000/CH29-quickstart.html)</p> <p>Wear long trousers and closed toe shoes whenever handling cryogenic liquids</p> <p>Wear loose-fitting, insulated gloves (e.g., heavy leather or "cryogloves") when hands can contact cryogenic temperatures</p> <p>Wear safety glasses with side shields (room pressure cryogenics) or face shield with safety glasses/side shields (pressurized cryogenics) when handling cryogenic liquids</p> |

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| 4 | Lifting objects | Musculoskeletal discomfort or injury | <p>Be sure you understand the load - assess its weight, size and balance</p> <p>Get assistance with lifting heavy and/or awkward loads</p> <p>Use a mechanical lifting device when possible</p> <p>Assure a clear path when moving loads</p> <p>EHS0056 Ergo material handling & body mechanics in labs</p> |
| 5 | Work with or around hazardous chemicals, including generating hazardous waste | <p>Exposure (inhalation, skin or eye contact) or other hazards due to use of or proximity to hazardous chemicals</p> <p>Fire from flammable materials</p> <p>Exposure, injury, fire or property damage caused by uncontrolled reactive or explosive materials (e.g., pyrophorics, water reactives, chemicals with explosive properties)</p> | <p>EHS 0348 Chemical Hygiene and Safety</p> <p>Know the hazards of the materials you are working with. Consult MSDS or other sources for hazardous properties of materials including incompatibilities</p> <p>Label containers of stock, in-process and waste chemicals properly per the Chemical Hygiene and Safety Plan (CHSP) and PUB-3092 Waste Generator Guidelines</p> <p>Label and test peroxide-forming chemicals. Consult the CHSP for a list of potential peroxide-forming chemicals.</p> <p>Assure that all hazardous liquids are stored within secondary containment.</p> <p>Perform Hazard Assessment and utilize controls specified</p> <p>Use properly functioning fume hood or other containment for any procedure that liberates hazardous particulate, vapor or mist</p> <p>Wear lab coat, closed toed shoes, safety eyewear (e.g., safety glasses with side shields, goggles, and face shield) as appropriate. Consult CHSP for details on Personal Protective Equipment.</p> <p>Wear gloves appropriate for the material being handled (consult glove selection guide links from the CHSP)</p> <p>Assure that emergency eyewash and/or safety shower are available for any use that poses an eye, face or body exposure hazard</p> <p>Store and use all materials to avoid incompatibility reactions. Refer to the CHSP and MSDS.</p> <p>Dispose of unwanted or out-of-date chemicals regularly</p> <p>Clean up spills only as provided for in the red/white Emergency Response Guide (flip chart) and in the CHSP</p> <p>Assure that proper fire extinguisher is available</p> <p>Store quantities in excess of 10 gal/room in flammable storage cabinet</p> <p>Store flammable hazardous waste in flammable storage cans, or glass bottles not exceeding 1 quart capacity</p> <p>Assure that ignition sources are not present in flammable atmospheres</p> <p>Store and handle in a non-reactive medium (eg, in inert-atmosphere glovebox, under oil if applicable, refer to the CHSP and MSDS)</p> <p>Control energy release with appropriate controls (e.g., ice, rate of addition of reactants, shields, etc.)</p> |
| 6 | Work with pressure or vacuum systems, or cryogens | <p>Hazards of any work with pressure or vacuum systems, or cryogens</p> <p>Injury or property damage resulting from uncontrolled release of mechanical energy</p> <p>Skin, eye or inhalation exposure to cryogenic temperatures</p> | <p>EHS0170 - Cryogen Safety</p> <p>EHS0171 - Pressure Safety</p> <p>Assure that all systems are equipped with pressure relief devices set below Maximum Allowable Working Pressure, or that all components are rated above the maximum available pressure</p> <p>Restrain all cylinders against movement</p> <p>Store cylinders with proper separation between incompatible gases</p> <p>Conform to the requirements of Activity Hazard Document(s)</p> <p>Wear long trousers and closed toe shoes whenever handling cryogenic liquids</p> <p>Wear loose-fitting, insulated gloves (e.g., heavy leather or "cryogloves") when hands can contact cryogenic temperatures</p> <p>Wear safety glasses with side shields (room pressure cryogens) or face shield with safety glasses/side</p> |

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| | | | shields (pressurized cryogenics) when handling cryogenic liquids |
| 7 | Working with or around electrical equipment without "Qualified Electrical Worker" status | Electrical shock and arc flash | EHS 0260 Basic Electrical Hazards and Mitigations Assure that all electrical >50V AC or DC is shielded against contact Periodically check equipment and cords for damage. If damage is found, remove the equipment/cord from service until it is repaired or replaced. ENG 1001 Electrical Safety |
| 8 | Soldering electronic components using lead-based solder and non-flame heated tips | Exposure to lead via incidental contamination | EHS 0243 Soldering Awareness Training Wear safety glasses with side shields or goggles when soldering Wash hands and face after completing lead work and before eating |
| 9 | Operating stationary metalworking tools (e.g., drills/drill presses, grinders, bandsaws, mills, lathes, sheet metal tools) | General | Obtain specific instruction and qualification on that tool |
| | | Eye injury from flying objects | Wear safety glasses with side shields or goggles at all times. Wear face shield in addition to safety glasses when operating any tool that produces flying chips Use chip shields when available. |
| | | Laceration or amputation | Always operate with supplied tool guards and/or chip shields in place and adjusted properly. Properly lock out and tag out (LOTO) the machine before making tool changes, unless exempted by PUB 3000, Ch 18, 18.3.2. http://www.lbl.gov/ehs/pub3000/CH18/CH18.html#1832 Do not wear gloves when operating machines with rotating parts (e.g., drill presses) |
| 10 | Operating portable or hand metal-working tools (e.g., saws, drills, chisels, grinders) | Electrical shock, eye injury from flying objects, laceration | Wear safety glasses with side shields or goggles when operating powered tools Always operate with supplied tool guards and/or chip shields in place and adjusted properly. Keep tools sharp Wear protective gloves when laceration hazard exists and the task permits Repair or replace broken tools immediately Assure that cord-powered portable tools are either double insulated or grounded, and are plugged into GFCI-protected outlets. |
| 11 | Using tools with exposed sharp points (e.g., needles) | Laceration, puncture, injection, liquid splash | Evaluate available tools and pick the safest device that will accomplish the Work (e.g., safety-engineered needle devices rather than open needles), Wear (at minimum) safety glasses with side shields whenever dispensing liquids through a needle. Handle and dispose of contaminated, non-contaminated, regulated and non-regulated pointed sharps into sharps or other containers in accordance with PUB-3093 "Medical and Biohazardous Waste Generator's Guide" and (if applicable) your Biological Use Authorization, Registration or Notification. Avoid recapping needles - do not recap unless recapping is the safest alternative. If you must recap, use one handed recapping techniques. Do not recap if biohazardous materials or agents may be present. Consult the Biological Use Authorization (if applicable) for additional details. If the point is present on a machine, evaluate the machine for the necessity of Point-of-Operation Guarding |
| 12 | Using tools with exposed sharp edges (e.g., razor blades, scalpels, chisels) | Laceration or amputation of extremities or other body parts | Determine if a safer alternative to the edged tool can be used to accomplish the Work (e.g., wire stripper versus razor blade) If the edged tool must be used, evaluate available tools and pick the safest device that will accomplish the Work (e.g., scalpels with longer handles are often more controllable than razor blades; razor blade holders should be used rather than unprotected blades). When applying force, point the tool away from the body. Wear protective gloves whenever the Work permits. Cover edges or dispose of edged tools as soon as the Work is completed (e.g., into a sharps disposal |

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| | | | <p>container without re-covering the edge). Do not leave unprotected sharp tools on the work surface, in a drawer, or anywhere else that accidental contact is possible.</p> <p>Handle and dispose of contaminated, non-contaminated, regulated and non-regulated edged sharps into sharps or other containers in accordance with PUB-3093 "Medical and Biohazardous Waste Generator's Guide" and (if applicable) your Biological Use Authorization, Registration or Notification.</p> <p>If the edge is present on a machine, evaluate the machine for the necessity of Point-of-Operation Guarding.</p> |
| 13 | Working at the Advanced Light Source | Working with Synchrotron Radiation | <p>ALS1001 Safety at the Advanced Light Source</p> <p>EHS0470 General Employee Radiation Training</p> |