



## **Specific Safety Regulations for the Division of Synchrotron Radiation Research**

This document contains specific safety regulations for the Division of Synchrotron Radiation Research, including rules and guidelines that have to be followed when working in the laboratories. Safe working practices, ensuring the safety of both the individual laboratory user and other users, are of overriding concern.

All laboratory users must read and understand the information in this document before working in any of the Division's laboratories, which is to be certified by signing the attached declaration form. This declaration is to be updated every year.

This document will be updated annually or when otherwise necessary. All employees are invited to make suggestions for the improvement of these policies.

### **General**

Keep the laboratories clean. Keep tables and benches tidy, and the floors as clear as possible. Arrange cables and hoses in an orderly fashion to prevent tripping and falling.

Keep all tools, equipment and lab material organized. Return them to their respective tool board, drawer, or cabinet after use.

Always ask permission before borrowing equipment from any of the labs. If you need the equipment urgently and cannot find the person responsible, make a note of what you borrow, your name and to which lab you are taking it. Once you have finished using the borrowed equipment, remember to bring it back to its original location and to notify the responsible person.

Equipment that is broken or malfunctioning should be clearly labeled and the group leader should be informed.

A Risk assessment must be carried out before commencing new experiments or a new activity (see below in Risk Assessment section)

Use protective equipment such as safety glasses, respiratory protection, and protective gloves when necessary. It is good practice to assume that all chemicals and gases are hazardous and therefore should be handled with care.

Eyewash solution bottles are available in all of the laboratories. Use them immediately if needed. First aid supplies are located in labs C162 (Idefix) in the Physics building and B020 in the Astronomy building.

Eating and drinking in the laboratories is not allowed if potentially harmful chemicals are present.

Be careful when lifting heavy objects or climbing, e.g. a ladder. Ask a colleague for help when necessary.

You must not work alone if dangerous operations are involved.

Hot plates in use should not be left alone for prolonged periods of time. Always label the hot plate while in use to avoid accidental burns. Strictly avoid the presence of any flammable material in the vicinity of the hot plate.



Before you leave the lab in the evening, check that all equipment that can be turned off is off. Flooding or fires during the night can have disastrous consequences. Turn off the lights and lock the doors. If an experiment is to be left alone during the night or over the weekend, the name and telephone number of the person responsible should be provided.

Corridors are escape routes and must not be cluttered with equipment, cupboards, boxes, etc.

Make sure that you are familiar with fire safety in the lab; check where the fire extinguishers are placed and study your escape route before you start any work.

All accidents and occupational injuries must be reported to the Head of the Division.

### **Handling of gases**

Carefully study the safety data sheet of the gas you are going to work with and if you have any questions, ask your supervisor or the gas supplier company.

All pressurized gas bottles must be securely fastened so they cannot fall; they should be either chained to the wall (not around the valve) or on wheeled stands for gas cylinders. Gas cylinders are extremely dangerous if the neck/reducing valve breaks, which can result in the gas bottle becoming a projectile that can pass through a wall. Gas cylinders are to be transported on carts intended for this purpose and reducing valves should be removed prior to transport.

Check that you have the correct gas cylinder and valve or reducing valve. Gas cylinders must only be connected to a reducing valve that is compatible with the gas to be used. If a mixture of gases is to be prepared for an experiment, only gas bottles approved for such use may be used.

Gas bottles not in use (small 1L cylinders) must be stored in the gas storage cabinet in Laboratory C164 (Miraculix, Physics building) or B050 (Astronomy building). Dangerous gases that need to be stored in a vented cabinet should be stored in Laboratory B050 in the Astronomy building. Please ask Estephania Lira or Rainer Timm before doing so. Large, pressurized gas bottles that are not in use should be stored in designated outdoor gas storage places (e.g. outside Media Tryck beside the recycling station, or at the back side of the Astronomy building).

Special care must be taken when working with flammable gases, such as hydrogen or methane. Procedures to mitigate the associated risks should be detailed in the Risk assessment for such experiments and must be strictly followed.

Exhaust gases from vacuum pumps must not be released into the building. The highly poisonous substance dioxine can be formed from the oily mist produced by rotary pumps.

Doors to rooms in which gas cylinders are stored are to be marked with the appropriate hazard sign for gas cylinders. This information is important for firefighters in the event of a fire.

It is strictly forbidden to transport any gas bottles by car, bike, or public transportation.



## **Chemicals**

Information on newly purchased chemicals (including gases) must be reported to Estephania Lira or Rainer Timm, including the name of the purchaser, and the name, quantity and storage location of the chemical. This information will be registered in the University's system KLARA.

New chemicals that have not been used before at the division may only be ordered if this has been discussed with and permitted by Rainer Timm or the head of the division.

A Risk assessment must be written for any process that requires the use of a chemical. Consult the Material Safety Data Sheet to find information about the chemical, the possible risks of working with such chemical and to learn how to minimize them.

Use appropriate personal protective equipment and wear proper clothes when working with chemicals, according to their Material Safety Data Sheets.

Use a suitable container when transporting dangerous chemicals, such a bucket containing vermiculite intended for this purpose. The transport of personnel in an elevator together with dangerous/flammable substances is prohibited.

The Division of Synchrotron Radiation has access to the Nuclear Physics chemistry lab. Dangerous chemicals should be stored in that lab; contact Estephania Lira or Rainer Timm for information on how to do so. Flammable solvents (ethanol, acetone, etc.) are stored in ventilated cabinets in Lab C164 (Miraculix) and in Labs B050 and B020 in the Astronomy building. The Division can only store 5 L of flammable solvents, so if there is need for a greater storage capacity, contact Estephania Lira or Rainer Timm for alternative solutions. Other non-hazardous chemicals can also be stored in the ventilated cabinets as long as they are not oxidizing (incompatible with flammables).

All solutions/samples must be labelled with the contents, any necessary hazard symbols, the name of the owner and the date.

In case of solvent spillage, remove all ignition sources. A spill control kit can be found in the ventilated cabinet in the Miraculix lab (the same one where the solvents are stored). Within the kit you can find different absorption materials to be used depending on the degree of the spillage. Small spills can be cleaned by using paper towels.

## **Liquid Nitrogen**

Contact with liquid nitrogen can cause frost bite on the skin and eyes. The reaction on the skin is similar to that caused by burns and permanent damage to the eyes can result from splashes of liquid or contact with cold gaseous nitrogen. Therefore, always wear protective gloves, certified for handling liquid nitrogen, and safety glasses. Wear long trousers and proper shoes, not sandals.

Evaporation of liquid nitrogen can cause suffocation, therefore, ensure there is adequate ventilation when storing and handling liquid nitrogen.

Liquid nitrogen must not be stored in sealed containers as there is risk of explosion due to excess pressure.

The transport of personnel in the elevator together with liquid nitrogen is prohibited, because it can cause asphyxiation in confined spaces.



Ensure that vessels containing liquid nitrogen cannot tip or be overturned during transport or storage.

### **High voltage**

Open high-voltage contacts should be avoided. If they have to be used, they must be labelled properly and extreme care has to be taken when working with them. Experiments with open high-voltage contacts must not be left alone.

Open contacts to voltages higher than 220 volts must be strictly avoided.

Always disconnect power supplies and discharge capacitors before attempting to carry out any work on electrical equipment.

### **X-rays**

Exposure to X-rays may cause serious harm. Therefore, a special personal safety training is required before using the X-ray lab at the division (in room B048 in the Astronomy building). Contact Johan Gustafson if you want to have access to the lab.

### **Risk assessment**

Risk assessments must be carried out for all laboratory activities where there is a risk of injury, damage, or exposure to hazardous chemicals. Please follow the points below when preparing risk assessments.

A written Risk assessment must always be prepared at the start of a new project that may be associated with a hazard or that uses chemicals. The Risk assessment is only valid for one year. After this time an updated version should be written.

Risk assessments of laboratory operations should be written by the person who is to perform the work. When preparing a risk assessment, think thoroughly about the steps that the process involves, the possible risks attached to it and how to minimize them. A guideline on how to write Risk Assessments can be provided. Risk assessments are to be approved by Rainer Timm before work commences.

Rainer Timm  
Head of Division

Johan Gustafson  
Deputy Head of Division

Estephania Lira  
Health and Safety Representative

February 2023