

---

# **Risk assessment for FYSC12 Nuclear Physics laboratories: KF1, KF3, KF6, and KF7**

Eric Corrigan, Joochun Park, Hanno Perrey, Emil Rofors, Anton Sâmark-Roth, Daniel Cox, Nicholai Mauritzson,  
and Luis Sarmiento  
*Department of Physics, Lund University, S-22100 Lund, Sweden*

## **Risks:**

- Ionizing radiation from alpha, beta, neutron, and gamma sources.
- Liquid Nitrogen frostbite
- Electrical shock
- Physical harm with heavy shielding material (lead).
- Toxic liquids in the vicinity.

## **General Rules for the Laboratories:**

- This document must be read and signed by all parties involved in the nuclear physics laboratories.
- It is forbidden to eat, drink, smoke, snuff (snus) and apply cosmetics in the lab.
- Heavy equipment must be transported by at least two people.
- Lead shielding may only be moved, if gloves and safety shoes are used.
- Do not block any escape routes, take fire safety into consideration. Check where the next fire extinguisher is located and know the location of the nearest emergency exits and assembly points.
- This is a living document. It will be checked and updated regularly.

## **Radioactive Sources:**

- The University's general safety instructions regarding ionizing radiation must be read and understood by all parties involved. Available on Live@Lund.
- People working at the lab are required to bring their own radiation badge. Accompanying persons should be in company of a lab worker wearing a radiation badge.
- Prior to using a radioactive source, all parties must thoroughly discuss the task at hand so that they understand: – the radiological situation, especially the dose rate;– their role in the use of the source i.e. handler or observer;– where they should position themselves during the use of the source; – what they should be doing at all times during the use of the source.
- Both the source handler and observers must apply standard ALARA principles during the usage of the source.

- 
- Prior to use, a walkthrough of the task at hand without the source shall be performed as an ALARA rehearsal.
  - Always move slowly and methodically. Do not rush your activity.
  - Wash your hands thoroughly with soap and water after using radioactive sources.
  - In the laboratories mixed-field gamma/neutron source may be used. Special care has to be taken to reduce the exposure of all parties to the neutron field.
  - Personal radiation monitors should be used to evaluate new (unknown) sources, this is especially important when using neutron sources.
  - In case of use of thin window beta and gamma sources they have to be handled with additional care by all parties (Do not damage the window.)

**Liquid Nitrogen:**

- Liquid nitrogen (LN<sub>2</sub>) may cause frostbite by contact with skin or eyes. Gloves, safety glasses and closed shoes have to be worn whenever LN<sub>2</sub> is handled.
- Liquid nitrogen may only be used, transported etc. after instruction by experienced personnel.
- Vessels containing LN<sub>2</sub> must be labeled.
- Liquid nitrogen must not be stored in sealed containers. There is a risk of explosion.
- Ensure sufficient ventilation when storing and handling LN<sub>2</sub>. Evaporating LN<sub>2</sub> might cause suffocation.
- When LN<sub>2</sub> is to be transported using a lift two persons should be involved at origin and destination levels. Accompanying persons must not be in the lift when LN<sub>2</sub> is transported.
- LN<sub>2</sub> vessel must be secured against spilling and tripping when transported and stored.

**High Voltage and Electronics:**

- Make sure the equipment is properly earthed.
- Whenever possible use ground fault circuit breakers.
- Switch off the power when handling electrical connections.
- Check cables for damage before use.
- In case of electrical fire use CO<sub>2</sub> fire extinguishers.

Name: \_\_\_\_\_

Signature / Date: \_\_\_\_\_