

# Safety regulations at GSI in general and at the FRS in particular

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## 1. Introduction

Welcome to the FRS! However, before starting to work in this environment:

- make sure that the GSI form “F.14 – SAFETY AT GSI” (see English version at <https://www-alt.gsi.de/documents/DOC-2009-Mar-215-1.pdf> or the German version at <https://www-alt.gsi.de/documents/DOC-2009-Mar-214-1.pdf> ) containing your personal data has been filled, signed and sent to the secretary of the safety&disposal department of GSI; copies can be found in this Log Book; it is sufficient to fill this form once per year!
- read the following safety regulations!
- sign at the end of this text!

In order to get further safety instructions for work at the FRS, please contact the FRS department leader, Christoph Scheidenberger, or Karl-Heinz Behr (deputy in terms of safety).

## 2. General safety

**SAFETY FIRST! Whatever you do or plan to do: think about safety to prevent accidents or injuries – of yourself, your colleagues, or the environment and equipment!**

**You must neither work alone in the laboratory nor work for more that 10 hours continuously!**

All important telephone numbers and provisions in case of an accident or illness you find in the online telephone book on the GSI web-pages <https://www.gsi.de/en/topmenu/telefonbuch.htm> (in English) and <https://www.gsi.de/topmenu/telefonbuch.htm> (in German); at this page, one also finds “Important Numbers” (e.g. Emergency, Police, Fire, First Aid Helpers, etc.)

Everybody working at GSI is responsible for compliance with the Safety Requirements of the GSI Safety and Radiation Protection Division.

When starting to work, be sure that you are informed about the possible hazards and that you know the location of the nearest fire alarm box, fire extinguisher, general emergency stop button, emergency exit, cooling water switch-off, power-off (affects only the present room) and the nearest telephone.



Fire alarm  
button



Fire  
extinguisher



Button for power  
emergency stop



Sign for  
emergency exit



Cooling water  
switch-off



Electrical stop  
of this room

**Fire:** If there is a fire it must immediately be reported to the fire department by using the fire-alarm box (you find them in corridors, staircases and near by the main entrance of the ESR hall). A small fire you can put out by using the fire extinguisher. Areas which have an automatic fire-alarm (i.e. stockroom, computer center) are characterized by non-smoking plates. Make sure you know the locations of emergency exits and fire extinguishers.

**Electrical accident:** In case of an electrical accident (emergency) in an experimental area please push the next emergency button and follow the instructions given in the GSI online telephone book on the web-pages mentioned above. Make sure you know the location of the next emergency button.

**Mechanical work:** Only if you are instructed you are allowed to operate machines like turning lathes, circular saws, cranes or milling machines. All protection provisions for GSI staff (e.g. safety glasses, safety shoes, lab coats or protective clothing) is also required for our guests and is located in the cabinet at the entrance of S4.

**Waste, toxic materials:** Do not dispose e.g. corrosive, radioactive or flammable liquids, chemicals or oil. Check with Dr. Karsten Vogt (phone 2414, e-mail [k.vogt@gsi.de](mailto:k.vogt@gsi.de)) or his deputy Mr. Frank Baumann (phone 1579, e-mail [f.baumann@gsi.de](mailto:f.baumann@gsi.de)) for disposal procedures. If you want to bring along e.g. solvents, acids, any toxic material or cryogenic liquids, please also Mr. Vogt or Mr. Baumann.

If at any time you are concerned about the safety of yourself or others, please contact a member of the Safety and Radiation Protection Division or call the accelerator operator (tel. 2222)!

### 3. Radiation safety

All users are obliged to learn about labor and radiation protection at GSI and to attend relevant lessons which are given by the Safety and Radiation-Protection Department (SIST). Alternatively, there is the possibility of computer-based learning, which can be done anytime at any computer with internet access.

**Working with lasers:** If working with lasers of the category 3A, 3R, 3B or 4 you also need to learn about laser-related protection. If the last time that you were instructed was more than 12 months ago, it is indispensable for you to redo the learning. Furthermore, you have also to be instructed about potential dangers at your working place by the person in charge of the particular cave/set-up. You must not start any experimental work before having learned about all relevant instructions and having confirmed this by your signature.

**Radiation-protection control:** A user who comes from a German research facility/institute/university and wants to work with radioactive material or in UNILAC/SIS/ESR areas is subject to radiation-protection control and needs to have a valid permit according to the Radiation-Protection Ordinance (the so called §15-licence). A copy of this permit has to be submitted to the SIST-Department in due time before the start of the experiment. The permit requires and refers to a Demarcation Contract (contract concerning the definition and division of powers and duties of the safety departments in the home and guest institutes), which is why we ask you to contact the SIST-Department at GSI at an early stage, when preparing your coming to GSI.

When working at GSI you are obliged to wear an official **personal dosimeter** (a) either of your home-institute or (b) of GSI. This film personal dosimeter must be suitable to register  $\gamma$  and neutrons. If you use a personal dosimeter from your home institute, you have to submit a letter from your radiation-protection officer. This letter must state that (aa) there is no objection for you to working in control areas and (bb) that you had a medical check within the last 12 months (date of medical check has to be indicated in the letter). In addition, the effective doses (noted in mSv) already received this year and that received during your working life have to be indicated in a separate letter. Please make sure to have all necessary documentation and an official film personal dosimeter on your arrival at GSI.

(b) In case you cannot submit such a letter as stated in (a) but want to obtain an official personal dosimeter from GSI you have to be examined by an authorized physician who will communicate to the SIST-Department whether you may handle radioactive material and/or may work in the experimental areas of UNILAC/SIS/ESR. (Please ask the SIST-Department for name and address). The official personal dosimeter and consequently the working permit for the experimental areas, however, will not be issued, unless the physician has given his written consent and the user has got to know the instructions on safety and radiation-protection. Please note, that getting everything together can take up to 4 weeks. If you intend to bring radioactive sources or materials to GSI or any material that is

biologically hazardous, toxic, inflammable or caustic, you have to inform the SIST-Department one month prior to your arrival at GSI, since you need its consent for the use of these kinds of materials at GSI. Therefore, the SIST-Department has to be informed in writing about how to use and handle the respective material. If you intend to transport the material on the road you have to observe the legal terms and regulations regarding hazardous-materials transportation. If necessary you have to get the relevant information about transportation from the safety representative in charge at your home office or home town.

All users have to follow the instructions of the GSI personnel and have to observe the respective regulations about safety and radiation protection. Furthermore, those users who have brought along materials to GSI have to make sure that these materials are either taken back home, eliminated or professionally disposed of (according to the applicable regulations) at their own expense in due time after the experiment.

**Insurance:** all users have to have adequate insurance coverage, especially liability and accident. It is necessary to take certification documents on this with you. The user will exempt GSI and its employees from liability in all cases other than malice aforethought or gross negligence.

In order to guarantee safe working conditions at the GSI facilities and also in order to avoid any delay in experiment start all users are strongly requested to follow the procedures described above. The user is also asked to clarify safety questions that might not have been mentioned here.

#### **4. Safety issues involving the FRS**

Work at the FRS is only allowed after a safety instruction by an authorized safety agent of GSI and the FRS department leader Christoph Scheidenberger or his deputy in terms of safety, Karl-Heinz Behr. The instructions concerning safety have to be followed! This also includes the safety issues involving the movable experimental equipment brought into the area.

##### **Special sources of danger are:**

- working at a height of 2 m without safe support
- thin vacuum windows
- degrader and large vacuum valves
- strong magnetic fields
- high voltages
- cranes
- flammable or poisonous gases
- gas alarm (nitrogen, hydrogen, flammable gas)
- radioactive sources
- robots

##### Safe support in working at 2 m beam height:

Safe footing working at the beam height of 2 m for FRS is assured only by using secure ladders or platforms. Climbing on the experimental equipment support should not be done (not only is it personally dangerous but it could disturb the alignment). Standing on chairs and stools is not allowed.

##### Thin vacuum windows:

Along the beam-line and at the end of FRS thin large-area vacuum windows are used. All windows must be tested and approved to operate at pressures of 5 bar. During experiment preparation all windows must have protective caps. These caps may only be removed immediately before the experiment. When removing the covers, all persons present in the vault must wear ear protection to guard against pressure shocks should the window break. Since some windows are ferromagnetic, special care should be taken when turning on or off magnets.

### Degrader and large vacuum valves:

Never reach through valves, movable degraders, slits etc. The moving parts exert extremely strong forces!

### Strong magnetic fields:

Strong magnetic fringing fields are present throughout the system. Caution is advised when working around magnets with ferromagnetic tools or watches, glasses, credit cards, etc.. Additional caution is necessary for people who rely on electronic-assisted medical devices (heart pace maker etc.).

### High voltages:

HV cables are and must be red. In general high voltages exist at ion pumps and detectors. Caution is advised around damaged cables and in thin detectors containing high voltage. Only certified connectors and cables should be used. If you must work on high voltage equipments use only one hand and the other hand should not be on or near electrical ground. Caution is also advised around water leaks! Windows of detectors using high voltage should have a protection cover which is removed only during the experiment.

### Cranes:

Using small cranes mounted in the vaults or in front of the counting shack ("Messhütte") is allowed only after GSI official instruction (which takes place once per year). If you need the big crane of the target hall, ask e.g. Bogdan Szczepanczyk to operate it for you. Never stand near or below hanging equipment!

### Flammable or poisonous detector gases:

Gas tight and mechanically reliable connections and valves must be assured in equipment using flammable or poisonous gases. Gas exhaust lines are to be used. Proper ventilation should also be assured in these areas.

### Nitrogen, hydrogen, or flammable gas alarm:

When the horn sounds, one of the different gas sensors has indicated burnable gases or low oxygen concentration in the surrounding air. Danger of explosion or suffocation occur. Please do following:

1. Leave immediately the S4 Area
2. Inform your co-workers!
3. Inform the Safety Department (phone number 2700, pager of the Safety Engineer on duty 125291....), Main Control Room tel. 2222.

### Radioactive sources:

Radioactive sources should be removed from their safe only for measurements. Inform colleagues working in the area of the radiation hazard and post a sign when in use.

### Robots:

Automatic robots are installed at the FRS target and S1 areas. These devices must be used exclusively by the instructed FRS engineers in charge!

**Please follow these rules and inform younger coworkers about existing dangers in the work area.**

**Please indicate that you have read and agreed to follow these safety instructions by signing in this book.**