DRAFT 1.2: Enclosure A1- for access to the DAFNE Beam Test Facility.

Internal safety regulations for experimental activities inside the BTF test laboratory.

I Italian Regulation

1) The rules for the ionising radiation protection are referenced from the following:

    a) Italian Regulation for Radiation Protection Law n. 230/95 and any addendums.
    b) Internal Regulations for protection against ionising radiation during DAFNE operation.
    c) LNF regulations for the use of radioactive materials and x-ray machines.

2) The regulations for conventional safety are referenced from:

    a) D. Lgs. 626/94 and any addendums.
    b) The LNF Emergency Plan.
    c) Safety procedures in case of emergency or hazardous conditions.

II Introduction

The following rules regulate working activities in the BTF test area (the Test Beam hall and the Test Beam Control hall) for the purpose of protecting the health and safety of the staff at the working site.

a) Access rules and procedures

    1) Only personnel that has passed the internal safety tests on the rules for experimental activities are permitted to work in the BTF laboratory.
    2) Any activity in the BTF test laboratory which could pose a hazard must be carried out by at least two workers.
    3) Any Responsible of the experiment, or person appointed by them, who takes the key to access the BTF test laboratory in the DAFNE Control hall, must sign the relevant form, and also must record the date and hour of key withdrawal on the appropriate form.
    4) DAPHNE Control hall staff will only assign the key to personnel who possess the necessary requirements to access the LNF.
    5) After taking the key, the Responsible of the experiment, or the person appointed by them, must report the name of the Responsible to the Surveillance Service so they know who to contact in case of emergency.
    6) The BTF test area must never be left unattended. At the end of any shift, the key must be handed over to the DAFNE Control hall personnel.
    7) The BTF test area is equipped with video cameras that monitor the test area at all times.
    8) Fires must be reported immediately by calling extension 5555 (see enclosure A5: Internal Emergency Plan of LNF).

b) Operation

1) Experimental groups must conform to the information regarding the function and operation of the BTF test laboratory, which can be found in the operation manual at: http://www.lnf.infn.it/acceleratori/btf/operation/
2) It is strictly forbidden to use the BTF equipment in any way that is not mentioned in the operation manual.
3) Experimental groups are responsible for any damage caused by operating the BTF in any manner not mentioned in the operations manual.
4) It is strictly prohibited to tamper with the emergency warning system.
5) It is strictly prohibited to access the hall where DAFNE instrumentation is stored (see photo), and the air footbridge in the BTF experimental hall (see photo and encl. 4).

III Risks in BTF test area

1. Video terminal activity

1) Working in the BTF test area exposes the staff to approximately 20 hours per week of video surveillance (see enclosure AII.2).

2. Magnetic fields

Technical information relating to magnetic fields in the BTF experimental area (see enclosure A4) can be found in technical documentation at (http://www.lnf.infn.it/acceleratori/btf/techdoc) and in articles concerning the characteristics of DAFNE magnets.

1) All magnets in the BTF test hall (2 QUADRUPOLES and 1 BENDING MAGNET) are managed by the BTF control hall like the other BTF magnets.
2) When an activity is carried out near the magnets, it is mandatory to switch them off.
3) It is strictly prohibited to remove the cover of the power connection or to modify equipment and installations in the BTF test area.
4) Personnel exposure to a magnetic field is unusual or nonexistent, as reported in enclosure AII.2,

3. Alignment laser

The BTF laboratory is equipped with two 4.5 mW class 3B lasers, which are used for aligning the experiments.

1) It is strictly prohibited to look directly at the laser
2) Personnel exposure to laser light is unusual or nonexistent, as reported in enclosure AII. 2.

4. Gas equipment

1) The BTF test laboratory is equipped with a gas distribution system which is placed in a locked external area. Here one can find the lines for the connection of gas cylinders and a clearing board equipped with the appropriate reducers inside the experimental hall. The BTF gas equipment consists of 4 independent lines: one is

for inert gas, and the other three are for hydrocarbons, with relative pressure reducers and a pump that can keep up to three different gasses.
2) Use, installation, and cylinder storage must be done by experimental groups and must follow the rules for using compressed gas.
3) The gas fence must always be locked.

5. DAQ and electronics

1) The use of all electronic control equipment in BTF test laboratory (crates, racks, DAQs, welders, testers, oscilloscopes, etc.) must be approved in advance with the Responsible of the BTF test laboratory, or with the person appointed by them.
2) It is strictly prohibited to move equipment, racks, cabinets, etc., without the proper authorization from the Responsible of the BTF test laboratory, or from the person appointed by him.
3) Experimental groups are responsible for any damage to the equipment.
4) Use of electronic equipment exposes staff to a regular risk, (see enclosure All.).

6. Crane

Only authorized personnel may use the crane to move equipment.

i. Installation of experimental apparatus

1) Experimental groups shall take care of all procedures to install their experiment and any relative electronic and mechanical devices. Any installation must be done in accordance with the law and with the safety rules.
2) It is strictly prohibited to alter any mechanical or electronic connections to the BTF line. If it is necessary to connect devices to the vacuum chamber, or any other part of the system, it must be discussed in advance and approved by the Responsible of the BTF, or by the person appointed by them, who will take care of all the relevant procedures.
3) Experiment must be installed and taking care to minimize the risk of obstruction or danger. Cables lying on the floor must be secured in order to lower the risk of tripping. (see enclosure All. 2.)

ii. Shields

1) It is strictly prohibited to remove the shields.
2) Blocks of cement that are part of BTF shield, can be removed temporarily and solely to permit the passage of experimental apparatus. This must be agreed upon with the Responsible of the BTF, or with person appointed by them.
3) Blocks should only be moved by qualified and authorized staff.

iii. Search Procedure for the experimental area

During DAFNE operation, the access to the BTF test area, and the experimental activities in the BTF test area are regulated by Internal Regulations for Radioprotection during DAFNE operation (Encl. 3).

In particular:

1) During the Global stage, or the BTF stage, the Linac does not start unless a search is conducted in the BTF test area.
2) The search is carried out by sequentially pressing special green buttons. In order to avoid the risk of tripping, the floor should be clear of obstacles.
3) The search must be carried out by two people in the following manner: one person stands at the entrance, prohibiting anyone from entering the area. The other person sequentially presses the search buttons which light up (the first button is near the control system rack, and the other button is near the exit of the main green door).
4) The area must then be locked and the entry key must be left in the control panel which is at the entrance.
5) The beam is then requested from the DAFNE control hall. As soon as the light on the key becomes red, the magnet necessary for the beam transport (DHSTB001) can be switched on.

iv. Admission to the area

1) Admission to the area is only permitted when the magnet DHSTB001 is turned off and the feeder (ALIMENTATORE) is on stand-by.
2) Admission must be requested from the DAFNE control hall.
3) Admission to the experimental area is only permitted if the light for the access key on the control panel becomes green and the key is able to be released from the panel.

v. Emergency buttons

1) BTF test area is provided with emergency buttons which shut down the LINAC when pressed.
2) Emergency buttons must only be used when necessary.

vi. Device control

1) Experimental groups can manage the control devices of the accelerator and the BTF directly from the BTF control hall.
2) BTF control windows are clearly indicated in the control menu (ZONE-TEST BEAM) and only these are allowed to be used. In particular, only the following devices can be modified:

    - magnets for beam transportation DHSTB001, DHSTB002, QUATB101, QUATB102, QUATB001, QUATB002, QUATB003, QUATB004, CVVTB001, CVVTB002, CHHTB001, CHHTB002
    - collimation slides TTGTB001, SLTTB001, SLTTB002, SLTTB003, SLTTB004
    - CAEN SYS2527
    - High Voltage
    - DAQ

One can refer to the user manual for any further technical clarifications regarding these devices and their use.

3) Use of the slide TTGTB001 and the magnet DHSTB001 must be carried out as specified in the user manual in order to avoid problems with the system functioning. The (above) mentioned devices are part of the DAFNE safety system.

vii. Installation and positioning table

The BTF has a table for experiment installation and positioning which is under remote control. Cameras permit its correct positioning and monitoring.

1) Table use is permitted to experimental groups only if the experiment does not obstruct table movement and any connection cables do not cause accidents.
2) The table may only be used if the weight of the experiment does not exceed the strength of the table.
3) It is strictly prohibited to plug any device into the table's power outlet.

viii. Electrical risks

1) Use of electric and distribution panels in the BTF control hall and the experimental hall must be agreed upon with the BTF Responsible, or with the person appointed by them.
2) Use of electric and distribution panels must be done in accordance with safety regulations.
3) It is strictly prohibited to use the electrical bus bar
4) Use of electric equipments exposes staff to regular risk, see encl. ALL. 2

ix. High Voltage power supply

1) The BTF is equipped with some high voltage power supplies for experimental use which can be controlled remotely. Their use must be agreed upon in advance with staff of the BTF. Cables and device connection must be done in accordance with safety regulations.
2) Use of electric equipment exposes staff to regular risk, see encl. ALL. 2

x. Equipment, tools, etc.

1) The BTF experimental area has tools, signal cables (LEMO, BNC), high-voltage cables, extension cords, adapters BNC, LEMO, T, etc. Users are responsible for their correct employment.
2) Experimental groups must replace equipment and must not leave it near magnetic fields or devices which can interfere electronically.

xi. Use of solvents, alcohol, radioactive sources, etc.

1) It is strictly prohibited to use any solvent or chemical product. If it is necessary, the use must be agreed upon with the Responsible of UF Prevenzione and Protection of LNF.
2) It is strictly prohibited to use any radioactive source. If it is necessary, the use must be agreed upon with UF Fisica Sanitaria of LNF.