The Safety Instructions for AREAL laboratory.

AREAL accelerator is composed of several systems and sub-systems. It is a complex of equipment, some of which in general can be dangerous and hazardous for personnel working in the laboratory. Thus the work at AREAL accelerator laboratory requires obeying of safety instructions and rules. In general the rules have the purpose to safe:

1. Personnel life and health
2. The equipment of the laboratory

The rules and instructions logically are divided to RESTRICTIONS, WARNINGS and RECCOMENDATIONS.

The RESTRICTION signs and rules are applied to the areas and places where the highest risk for unqualified personnel to harm or injure the health. The entrance to the areas with restriction signs is **prohibited**.

The WARNING signs are to inform about potential risks, which could be met and to prevent the personnel access to these areas without: informing authorized persons, performing necessary procedures and (or) having instructions on these areas. The entrance to areas with warning signs is **allowed with guidance** of qualified personnel.

The recommendations signs are to warn and to inform about possible risks, which can occur due to misbehavior or any other factors. Access to the areas marked with these signs **is not restricted** unless **the recommendations are taken into consideration**.

The obeying of the safety instructions is hereafter on your own responsibility to prevent accidents, health injuries, equipment damage, uncomfortable situations, etc.

1. Personnel Safety

To avoid any unattended movement all the areas, which contain health injury sources are marked with a corresponding signs, denoting the type of injury and the actions to perform before entrance. For personnel safety, it is strongly recommended to inform machine coordinator, or responsible person before entrance to any area with a specific warning signs. **It is forbidden** to carry food, drinks, snacks or any similar product, while entering to the laboratory area. **It is recommended** to take off heavy coats, jackets, bags and any equipment, which may fall or cause inconvenience during the movement.

The systems and sub-systems of the accelerator during the operation produce hazardous influence on the human health such as:

- Strong electromagnetic fields (RF - klystrons, waveguides)
- Strong magnetic field (undulator, other magnets)
- High Voltage (Modulators, Power Supplies)
- Ionizing radiation (Machine Hall, Other components)
- High Energy Laser Light (Laser, Mirrors, Machine Hall)

Systems and sub-systems are located at dedicated rooms, the entrance to which is **restricted**. Those areas are:

- Laser room
- RF room
- Machine Hall

To get the access to this location, one needs to contact to qualified person and access locations with guidance of such persons.

Laser Room:

The responsible person for laser laboratory of AREAL facility is Dr. Arsham Yeremyan. He must be informed and is responsible for any access to laser laboratory of AREAL. **Access** for unqualified personnel is **allowed only with the guidance of laboratory responsible or coordinator**.

Laser laboratory is a "CLEAN ROOM". Before the entrance it is recommended to wear out back bags, coats, any other wearing, which limits the movements. To preserve "CLEAN ROOM" room conditions before the entrance to clean room the wearing of shoe covers, robe, gloves, hair covers and protective goggles is a must.

During the laser operation the powerful laser light is emitted. There is a risk for health due to direct and indirect reflections of Infrared and Ultraviolet laser emissions. **It is FORBIDDEN:**

- to take off protecting goggles while working in the laser room
- direct look to the emission points and reflecting surfaces
- to level eyes to the laser transport line.
- to place any parts, which are not foreseen for laser work under laser light or on the transport lines
- to lay or put any heavy equipment or body parts on the optical tables and supports

To provide nominal work of the temperature stabilization system of the laser room it is not recommended to stand near or to cover the vents, fans and other parts.

RF Room:

The responsible person for RF room of AREAL facility is Dr. Ashot Vardanyan. He must be informed and is responsible for any access to RF room of AREAL. The **entrance** to RF laboratory during the machine operation is allowed only with **the guidance of qualified person**.

During the machine operation there is a presence of electromagnetic radiation in the RF room. The room is equipped with the monitoring dosimeters and access restricting line on the floor. It is **forbidden** to access the room during the operation.

When the RF system is completely switched off there are no potential risks or hazards, nevertheless to avoid the damage of cables, equipment of synchronization and timing system of AREAL machine, etc. the entrance is allowed with the guidance of qualified person.

Machine Hall:

The responsible person for Machine Hall (tunnel) of AREAL facility is Dr. Bagrat Grigoryan. He must be informed and is responsible for any access to Machine Hall (tunnel) of AREAL. The tunnel **access** is **allowed only with the guidance of qualified specialist**.

During the machine operation there are potential risks for health:

- Ionizing radiation
- High voltage electric fields
- Strong magnetic fields
- High energy UV laser light
- High pressure air
- Heated (high temperature) surfaces

For personnel safety the machine hall is equipped with Personnel Safety Interlock System, which switches off immediately all potential hazardous systems, such as Laser System, RF System, magnets, etc. The tunnel access is possible only with **activating Interlock brake**, which switches off all the potential risk sources. Nevertheless, the access to the tunnel is allowed only with coordinator or guiding persons. The tunnel access is registered in the control logbook of AREAL accelerator. For safety reasons the tunnel must be checked with the dosimeter before the access.

For accidental cases, (e.g. when some people remain in the tunnel) the tunnel is equipped with machine STOP buttons, which BRAKE the safety interlock and thus switch off all the systems. To bring the machine to the working state after such a BRAKE the special procedure (tunnel search) is required.

General Safety:

In case of fire or accidents the Machine Hall, Laboratories and control room are equipped with exits, which are marked correspondingly. There fire extinguishers are hanged on the corridor walls and there is at least one in each laboratory and two in machine hall.

In case of alarm all the personnel must leave the building and inform the coordinators and responsible persons about the alarm activation. Each system or sub-system has a personal alarm, which will stop the operation or functionality in case of emergency.

Hereby I confirm I read and accept all instructions in this form. By confirming I take all the responsibility of accidental occasions, which may occur as a result of not obeying the rules and instructions listed above.

Instructions provided by **Name, position, date, signature**	**Instructed participant confirmation** **Name, country, date, signature**
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