LABORATÓRIO DE INSTRUMENTAÇÃO
E FÍSICA EXPERIMENTAL DE PARTÍCULAS
partículas e tecnologia

RAD LIP
LIP Competence Centre in Radiation Engineering

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RAD LIP

Competence Centre in Radiation Engineering

TO BRING TOGETHER EXPERTISE AND KNOW-HOW ON RADIATION, DOSE, SHIELDING, EEE EFFECTS, MATERIALS EFFECTS.

TO PROVIDE INTERNAL CONSULTING AND FOSTER DISCUSSION

TO PROVIDE RADIATION PROTECTION CAPABILITIES

TO PROVIDE EXTERNAL CONSULTING AND REPORTS

Radiation Protection

RAD LIP should be able to take care of **all internal needs of LIP** in terms of **radiation protection** in all nodes.
We should also be able to **provide services** to community in **training** and in **consulting**.

- Strategy for development:
  - Invest in the training of a Level 1 Radiation Protection Technician; (~10k€)
  - Develop the Radiation protection plan for LIP premises
  - Develop radiation plans for other institutions (a radiation protection plan can have a price tag in the tens of k€)
  - Offer training plans for Level II or Level III technicians
    -> each trainee fee can be around 1-2k€;
    -> training opportunity for clinical technicians

Dose calculation

LIP has scattered competences and knowledge, which include the expertise in different simulation frameworks

- Physics of the interaction of different types of radiation with matter
- Some people/groups have competences in deriving absorbed doses from simulations and calculations
- Dose is intimately related with the effects observed (biological, electronics, materials)
- Providing dose estimation given a determined set of conditions is a possible service to help the community.
- Consulting and training in interaction of radiation with matter is also to be considered, mostly internal.

Shielding

One of the **recurrent requests for services/collaborations** is in the understanding of the necessary shielding to comply with a maximum dose.

Several skills come into place:

- Estimate the radiation environment
- Properly calculate or simulate the fluence in target
- Calculate/simulate the dose
- Guess the best material and width of the shielding material (explore the possibility of nonhomogeneous shielding)
- Estimate the configuration of the shielding and dose in the application

Effects on EEE Components

Radiation can produce several effects in electronic components: TID, SEU, Displacement Damage

- We have expertise in these as most of the detectors are operation in radiation harsh environments. LIP also has many expertise in testing different kind of EEE.

- Some people are used to irradiate components to estimate the effects or to qualify components. This also involves knowledge on type of radiation sources, available radiation sources and their protocols (for use and for EEE qualification)

- RADLIP should
  - Bring together the knowledge at LIP
  - Be able to provide service to community in radiation testing of EEE

Effects on materials

- Several materials are degraded with radiation
- E.g. fibres and scintillators may degrade performance with TID
- Although the testing is material dependent and extern expertise is necessary, the RAD LIP could take care of irradiation, source selection, protocols, etc.

In the future: Irradiation

IN THE FUTURE LIP COULD HAVE SOME IRRADIATION FACILITY FOR EXAMPLE FOR EEE

A PROFESSIONAL FACILITY THAT CAN PROVIDE SOME TYPES OF IRRADIATION

ONLY POSSIBLE WITH ADEQUATE FUNDING

ONLY POSSIBLE WITH ADEQUATE PLANNING (RADIATION PROTECTIONS, PROTOCOLS, ETC)

LIP CAN ALSO BE A VEHICLE TO PERFORM IRRADIATIONS AT OTHER FACILITIES THROUGH PROTOCOLS (HOSPITAL LINACS, CTN, SANTIAGO, CERN, ETC)

Call for Level 1 Radiation Protection Technician training

- Support the training of one Level 1 Radiation Protection Technician in the context of RAD LIP
- Training will probably be done either at CIEMAT or at a Portuguese company https://alvesrasteiro.pt/formacoes/protecao-seguranca-radiologica-nivel-i-area-medica
- The technician will oversee LIP radiation protection, prepare LIP radiation protection plan elaboration and implementation
- If you consider this training, please email Patrícia Gonçalves (patricia@lip.pt) before 25/10/2024 (internal call sent by email)