

# Metrological Laboratory of Ionizing Radiation

João Cardoso

The main activities of the Metrology Laboratory of Ionising Radiation (LMRI) can be described as:

- Research and training in metrology of ionising radiations;
- Maintenance of the ionising radiation national standards, under a protocol with the Portuguese Institute for Quality (IPQ);
- International cooperation with EUROMET, EURADOS BIPM, IAEA, WHO and EA, in the field of interlaboratory comparison of standards and measurements;
- Collaboration and support of other research groups performing measurements or irradiations;
- Services of metrological control of measuring instruments, according to national regulation (Portaria 423/98).

In 2006, the LMRI, has made one of its top priorities the maintenance of the Quality System (QS) according to the ISO 17025 standard and adapting it to the new standard, ISO 17025:2005. The LMRI QS is essential to the project named Mutual Recognition Agreement (MRA). This international project, now implemented in the five continents, mutually recognizes the national measurements standards of calibration and measurement certificates issued by the national metrology laboratories of the States that signed the Metre Convention.

In order to maintain and improve the equivalence of standards between national metrological laboratories, the LMRI has participated in two intercomparisons promoted by EUROMET. One in the radiation protection area for the quantity personal dose equivalent,  $H_p(10)$ , for the X-ray radiation qualities N-30, N-60 and N-120, described in the standard ISO 4037-1, called EUROMET project No. 738. The other intercomparison named, EUROMET project 813 and is a comparison of air kerma and absorbed dose to water for  $^{60}\text{Co}$  radiation in radiotherapy.

Regular collaboration with IAEA and WHO is maintained. The LMRI is a member of the Secondary Standard Dosimetry Laboratory (SSDL) network, a joint project between IAEA and WHO, and performs annually TLD audit of doses at radiotherapy level.

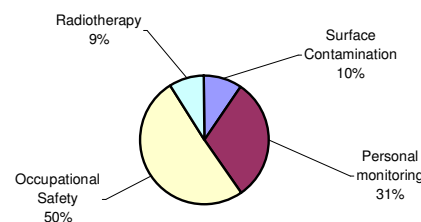
The collaboration with the European Radiation Dosimetry Group (EURADOS) has been improved in 2006. The LMRI was registered in Database of European Irradiation Facilities. This database provides information about the irradiation facilities for dosimetry research in Europe. This information is useful to researchers in radiation dosimetry to enable them to choose the most appropriate facilities to work.

The LMRI well-type ionization chamber, used mainly in radionuclide metrology in nuclear medicine, is being object of study, by experimental and simulation studies, in order to have a complete characterization of the ionization chamber response for different radionuclides and for different types of containers (syringes, ampoules, vials. This work is being made with the collaboration of the Nuclear Medicine Department of the Hospital Garcia da Horta, in Almada.

The LMRI website was improved during 2006. A new webpage was constructed with new information about the LMRI activities, laboratory equipment, services provided to the community and much more information and is now available to the public.

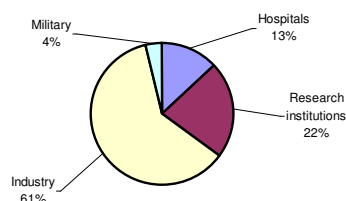
The LMRI calibration services are our more visible activity and we provided to the community, mainly for industry, universities, hospitals, armed forces and departments of ITN, services of metrological control. This metrological control of instruments for measurement of ionising radiation is being carried out under a contract with Portuguese Institute of Quality and is the enforcement of Portaria 423/98 from 21 of July. During 2006 were calibrated 114 dosimeters and about 700 TLD dosimeters were irradiated. The following figures can quantify the work done in this particular area.

**Instruments calibrated by type of use**



**Figure 1:** Distribution of calibrated instruments by type of use.

**Instruments calibrated by users activity**



**Figure 2:** Distribution of calibrated instruments by area of activity.

## Research Team

### Technical Personnel

J. CARDOSO, physicist  
L. SANTOS, technician

### Collaborators

A. CASTRO, technician