

EXPERIMENTAL FACILITIES

The scientific achievements of the Institute derive in part from the facilities and equipment available to its scientists.

Major facilities that are used by several groups from the Institute, the University, and other institutions, unique in Portugal, deserve special mention:

The Portuguese Research Reactor (RPI), a 1 MW swimming pool nuclear reactor which is used as a radiation source for manifold research tasks;

Ion beam laboratory with a Van de Graaff accelerator 2.5/3 MeV for RBS channeling, NRA, PIXE and ERD and the high fluence 200 kV ion implanter. A microprobe is being mounted in one of the accelerator beam lines;

Fourier transform ion cyclotron resonance mass spectrometer used for ion-molecule reactions and for high resolution mass spectrometry;

Radiation Technologies Unit (UTR) - ^{60}Co gamma irradiation facility, nominal activity 1.5×10^{16} Bq (400 kCi), present activity 3.0×10^{15} Bq (80 kCi);

Helium liquefaction facility - The existence of this facility in the Campus with a system for recovering the helium, makes the Laboratories at Sacavém the ideal place for experiments at low temperatures. Helium is supplied to several laboratories in Portugal.

It is important to refer several other facilities that are also unique in Portugal:

- Laboratories for handling radioactive materials
- Sample preparation laboratories for nuclear analysis
- Hot laboratory equipped with remote controlled hot cells
- Laboratories for neutron activation analysis
- Laboratories for ^{14}C and ^3H dating
- Laboratories for electrical transport measurements at low temperatures 0.3-400K, and under high magnetic fields up to 18T
- Mass spectrometer for isotopic ratio determination in light elements ($^2\text{H}/^1\text{H}$, $^{13}\text{C}/^{12}\text{C}$ and $^{18}\text{O}/^{16}\text{O}$)
- Neutron time-of-flight diffractometer
- Small angle neutron scattering instrument (under construction)
- Two-axis neutron diffractometer (under construction)
- High-resolution high-temperature X-ray diffractometer (under construction).

Other available facilities include:

- Clean room for radiopharmaceutical preparations;
- Clean laboratory for sample preparation for trace element analysis;
- Laboratory for animal experiments;
- Small accelerator 40 kV for nitrogen implantation;
- Metal vapour synthesis equipment;
- High temperature furnaces (induction furnace with Czochralski, float zone, and Bridgman, attachments with cold copper crucibles; arc furnace and controlled atmosphere resistive furnace);
- Electroerosion cutting machine;
- Several inert atmosphere glove boxes;
- Several high resolution gamma and X-ray spectrometers;
- Energy dispersive X-ray fluorescence spectrometer;
- Mass spectrometer for quantitative residual gas analysis;
- C, H, N elemental automatic analyser;
- High performance liquid chromatography (UV and radioactivity monitors);
- NMR spectrometers (Bruker 80MHz; Varian 300 MHz);
- Faraday microbalance for magnetic susceptibility determinations (up to 7T);
- Mössbauer spectrometer with He cryostat and split magnet of 5T (sources for ^{57}Fe and ^{151}Eu);
- X-ray 4 circle automated diffractometer;
- FTIR spectrometer;
- UV/VIS/IR spectrometers;
- Solution reaction calorimeter;
- Differential Scanning Calorimeter (DSC);
- Thermogravimetric Analyser (TGA);
- High speed centrifuge;
- Micro plasma welding station;
- Marple cascade impactor for aerosol collection;
- Universal testing machine;
- Laboratory for vibratory analysis (Applied Dynamics).