

EXPERIMENTAL FACILITIES

The scientific achievements of the Institute derive 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 MV for RBS channeling, NRA, PIXE and ERD and the high fluence 200 kV ion implantor. A microprobe has been assembled in the (p, γ) accelerator beam line;

Fourier transform ion cyclotron resonance mass spectrometer, used for ion-molecule reactions and for high resolution mass spectrometry, equipped with a new data station (Finnigan Venus Odyssey) and a quadrupolar axialization unit (Finnigan Dual QuadAx);

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 (see Fig. 1).

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

- Multipurpose Magnetic Characterisation System, MagLab2000 from Oxford Instruments, including AC-susceptibility, magnetisation and Specific Heat measurements in the range 1.5-400 K and under fields up to 12T. This system acquired under a special contract with PRAXIS was installed and became operational in the end of 1998.
- Laboratories for electrical transport measurements at low temperatures 0.3-400K, and under high magnetic fields up to 18T
- 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
- Two mass spectrometers for isotopic ratio determination in light elements ($^2\text{H}/^1\text{H}$ and $^{13}\text{C}/^{12}\text{C}$ and $^{18}\text{O}/^{16}\text{O}$)

- Neutron Time - of - Flight Diffractometer, ETV
- Small Angle Neutron Scattering Instrument, EPA (under construction)
- Two-Axis Neutron Diffractometer, DIDE (under construction)
- High-Resolution High-Temperature X-ray Diffractometer, Hotbird (under construction).

Other available facilities include:

- Clean room for radiopharmaceutical preparations;
- Clean laboratory (class 100) for sample preparation for trace element analysis;
- Seven PM10 air samplers and one PM10 automatic air sampler (developed at ITN);
- Two ultrasound anemometers;
- One Marple cascade impactor;
- Laboratory for animal experiments;
- 40 kV small accelerator 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);
- Electrocorrosion 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 spectrometer (Cary 5);
- Solution reaction calorimeter;
- Differential Scanning Calorimeter (DSC);

- Thermogravimetric Analyser (TGA);
- High speed centrifuge;
- Micro plasma welding station;
- Universal testing machine;
- Laboratory for vibratory analysis (Applied Dynamics).

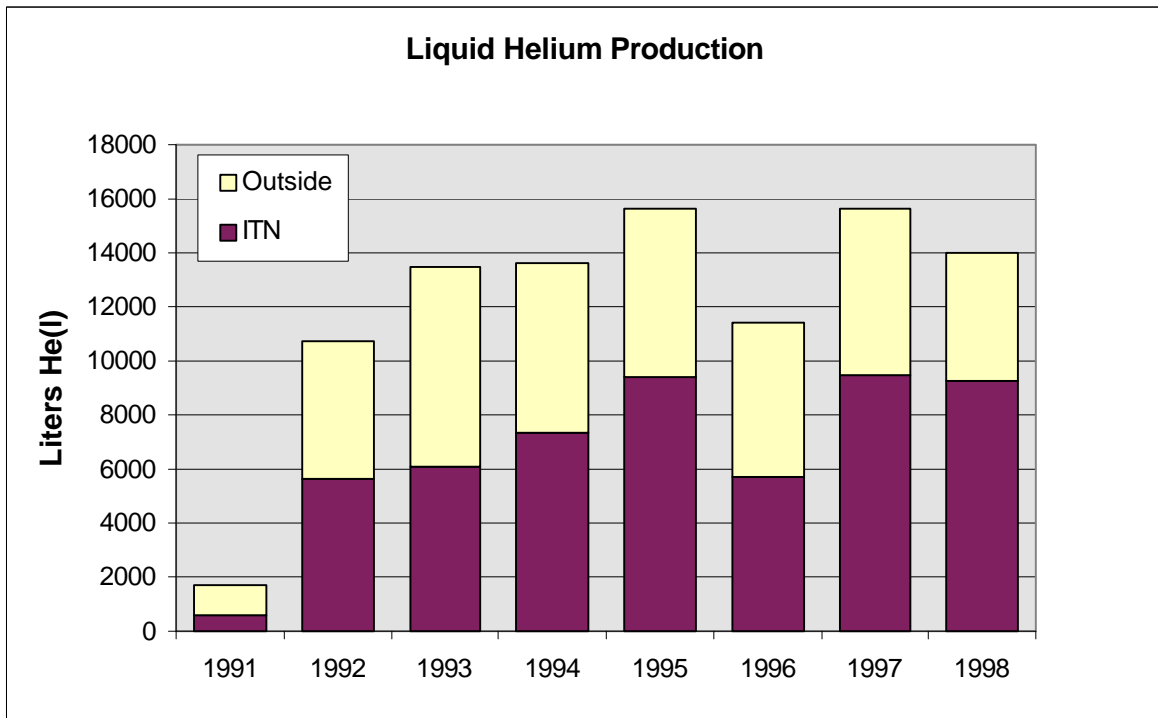


Fig. 1 - Liquid Helium supplied by ITN.

