

Reactors and Nuclear Safety Unit

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The year 2011 marks the 50th anniversary of the **Portuguese Research Reactor** (RPI). The reactor achieved its first criticality in the early hours of April 25, 1961, just two days before the inauguration of the then Laboratory for Nuclear Physics and Engineering. A small ceremony was held on April 27, 2011, with interventions of some of the key researchers in the early days and of the Minister for Science and Higher Education.

The Research Unit on Reactors and Nuclear Safety houses not only the RPI, but also the **Neutron Activation in Environment, Nutrition and Epidemiology** and **Applied Dynamics** groups. The RPI also supports activities for groups in the other Research Units of ITN, as well as in Universities.

A total of 6 researchers were hired under the *Ciência* initiative in 2008 and 2009, effectively doubling the number of full-time researchers in this Unit. However, these researchers reached 50% or more of their contracts during 2011.

The staff involved in all aspects of the operation and use of the RPI presents its activities under the common headline of **Operation and Exploitation of the Reactor**.

The **Neutron Activation in Environment, Nutrition and Epidemiology** group uses the k_0 INAA technique in the RPI and was again the main Portuguese user of the reactor in 2011, accounting more than 50% of the total irradiation time. The group is dedicated to

cycling and impact of trace elements in the atmosphere. It addresses, specifically, the development and application of nuclear techniques, source apportionment and tracking in the atmosphere, chemical speciation, uptake and release of chemical elements in biomonitors and monitoring, as well as health linkage through epidemiology and nutrition studies. These objectives are approached through research, included mostly in Ph.D. theses. The activities are essentially financed by the Foundation for Science and Technology (FCT).

The research performed by the **Applied Dynamics** group is mostly concerned by vibration and acoustic problems displayed by components of nuclear and conventional power plants. As such, a significant part of their research results has been motivated and funded by the French *Commissariat à l'Energie Atomique (CEA)* and the Portuguese *Electricidade de Portugal (EDP)*. However, the techniques developed by this group can and have been used to solve problems, both of industrial and fundamental nature, outside the realm of power generation, e.g., the development of advanced methods for tuning and restoration of the Mafra carillons. In spite of continuing to be one of the smallest groups in terms of ITN staff, this fact is compensated by an active collaboration with Universities and Research Laboratories, both in Portugal and abroad. The vitality of this group is well demonstrated by their research contracts and publications.

Staff

Researchers

J.G. MARQUES, Princ.
A. FALCÃO, Princ.
A. KLING, Princ. (85%)
A.V. ANTUNES, Princ.
M.C. FREITAS, Princ. (retired in 2011)
N.P. BARRADAS, Princ. (85%)
A.C. FERNANDES, Aux.
A.R. RAMOS WAHL, Aux. (85%)
D. BEASLEY, Aux.
H.M. DUNG, Aux.
M.A. S. PEREIRA, Aux.
S.M. ALMEIDA, Aux.
V. DEBUT, Aux.

Admin. & Techn. Personnel

A. RODRIGUES
F.B. GOMES
I. DIONÍSIO
J.A. M. RIBEIRO
J.C. ROXO
J.P. SANTOS
N. SERROTE
R. POMBO
R. SANTOS
T. FERNANDES