

RPI Dosimetry

Introduction

The main objective for the “RPI Dosimetry” activities is the characterisation of the radiation field of the facilities available in the reactor and the implementation of dosimetry techniques for specific purposes to support the reactor users.

The characterisation by the multifoil method of the neutron spectrum in irradiation positions of the reactor and the study of the gamma radiation field of the reactor with an ionization chamber were some of the activities carried out during 1998.

The study of the conditions for the implementation of an epithermal beam, in an irradiation tube, has been concluded and it is supposed to start the installation of the irradiation tube, in the first trimester of 1999.

Keeping in mind the interest of establishing new collaboration with research groups with similar interests, it is worth referring the following projects for the next year:

“PGNAA technique as applied to the determination of boron in biological samples”, with the teams of Reactor/ITN and of the Nuclear Physics Institute of the Czech Academy of Sciences;

“Exchange of Finnish-Portuguese experience in BNCT”, involving the team of Reactor/ITN and the teams of the Finnish BNCT Project.

Research Team

Researchers -	2*	(2 PhD or equivalent)
Research Student [#] (physical technology eng.) -	1	
BSC Last year Student (physical technology eng.) -	1	
Technicians -	1	

* with collaboration of Dr.José Marques, Dra. Isabel F.Gonçalves and Dr.J.Salgado

PRAXIS XXI Grantee

Publications

Journals –	1	and 1 in press
Proceedings –	3	
Special Publ. –	1	
Conf. Commun.:	3	
Theses:		
Lic. -	1	

	10 ³ PTE
Expenditure:	350
Missions:	
Other Expenses:	350
Hardware & Software:	
Other Equipment:	

		10 ³ PTE
Funding:		2 416
External Projects:	1998	2 416

Preparation of a Beam Tube of the Portuguese Research Reactor to be Used in BNC and Other Activities

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Abstract

Work is in progress aiming at the preparation of a beam tube to be used in various applications among which the ones in the area of BNC. In this context it is worth referring the use of a phantom to study the distribution of dose at the irradiation positions, the irradiation of biological samples, and boron determinations in biological samples using the PGNAA technique.

The MCNP code has been used to study several combinations of neutron filters to enhance the epithermal component of the neutron beam. The need for an adequate intensity of the beam, led us to select aluminium as the most convenient material.

The shielding was also calculated with the MCNP code and is designed so that access, to the location where the beam emerges, can be gained under radiation controlled operation, with the reactor running at full power.

8th Symposium on Neutron Capture Therapy for Cancer, La Jolla, Califórnia, 1998
Proc. "Frontiers in Neutron Capture Therapy", Publishing Corporation (submitted).

Current Work

Measurement of Gamma Dose Rates at RPI by Using an Ionization Chamber

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Abstract

An ionization chamber, Radiotechnique Compelec, type CRGA 11, has been calibrated at the Ionization Radiation Metrology Laboratory of the Nuclear and Technological Institute.

The calibration factor for kerma in air is $N_k = 4.33 \times 10^{-7} \text{ ampère.Gy}^{-1} \cdot \text{s}^{-1} \pm 4\%$ (for the average energy of Co-60).

The treatment of the data was performed in accordance with the procedures set up by the Portuguese Institute for Quality.

This ionization chamber will be used to determine gamma dose rates in the irradiation positions of RPI.

