

In-hospital BNCT and the PhoNeS project: status and perspectives

BNCT (Boron Neutron Capture Therapy) is being investigated as a promising form of therapy for those types of tumours that have not witnessed an improvement of the survival curve in the last 20 years: extended tumours (stomach, liver, lung), tumours located near or in vital organs (brain), radioresistant tumours (melanoma). It is a binary technique consisting in the administration of a ^{10}B compound to the patient who is then irradiated with a thermal (<10 keV) neutron beam: the $^{10}\text{B}(\text{n},\alpha)^7\text{Li}$ capture reaction produces high LET charged particles which stop in the cell containing the boron causing its apoptosis.

BNCT is presently limited by the need of a high neutron flux available only at nuclear reactors and by the lack of specificity of the boron carrier, two aspects that the PhoNeS (PhotoNeutron Source) project is addressing directly. This paper presents the results on the development of a converter+moderator system to be installed in front of the head of a standard radiotherapeutic linac for the production of a thermal neutron beam which has been characterized in terms of intensity and energy spectrum and the development of an imaging system based on a silicon microstrip detector to measure the boron concentration in biological samples (urine, blood, tissue) to obtain a kinetic curve (boron content as a function of the time from the patient uptake). The paper will present also the first steps of the application of BNCT to an explanted lung affected by mesothelioma.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://www.ts.infn.it/~prest/vienna_conference/summary_prest.pdf

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