

AbstractID: 3362 Title: Characterization of the proton beam of the Centre de Protontherapie d'Orsay with an on line 2D parallel plate ionization chamber

Purpose: To monitor and to evaluate on line the parameters of the proton beam at the Centre de Protontherapie d' Orsay (CPO) in France.

Method and Materials: A parallel plate ionization chamber has been developed in the University and INFN of Torino in collaboration with the CPO; the detector has a sensitive area of $160 \times 160 \text{ mm}^2$, with the anode segmented in 1024 square pixels arranged in a matrix of 32×32 ; each pixel has an area of $5 \times 5 \text{ mm}^2$ and a pitch of 5.1 mm. The detector has a maximum rate transfer of 5 MHz and the reading of the entire chamber can be done at a frequency of some kHz without dead time.

At the Centre de Protontherapie d' Orsay (CPO) a synchrocyclotron is used for the treatment of eye melanoma since September 1991 and for brain tumors since 1993. The dose delivery system is passive scattering and the proton energy delivered by the synchrocyclotron is 200 MeV which allows the treatment of lesions up to 22 cm deep in water.

The pixel chamber has been placed along the CPO beam line to monitor the beam shape and to measure the stability and reproducibility of the delivery system.

Results: Background measurements have been made to evaluate the pixel chamber noise; a procedure for the calibration of the detector has been beam applied that makes use of film measurements. Profiles and 2D dose distributions have been studied to see the uniformity of the delivery system and the reproducibility of the measures has been tested.

Conclusion: A pixel chamber developed in Torino has been placed on the proton CPO beam line. This detector allows a fast, accurate and non-intrusive 2D diagnosis of the beam both on- and off -line.