

On-line monitoring for particle beams

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The growing interest in charged particle therapy is due to its extreme precision in the dose delivery to oncological patients and the quality assurance for these treatments is mandatory. Dedicated on-line monitoring systems, based on the detection of the secondary radiation produced by the interaction of particle beams and matter, have been developed in the last years. The detection of the β^+ emitters, generated in the irradiated volume, using specifically developed PET system is one of the possible ways to realize the on-line monitoring of particle therapy treatments. Also, methods based on prompt- γ , that are emitted during the treatment have been developed and applied in clinical environment. The expectation of the scientific community is that the use of these monitoring systems in clinical practice will improve the precision of the treatments allowing the margins reduction in the design of treatment plans, enabling to take full advantage of the benefits of particle therapy.

These on-line monitoring systems are compact, do not interfere with the dose delivery, are able to provide in real-time information on proton beam range and are able to cope with high particle rates: all these characteristics made these systems easily adaptable also to other research fields, as the characterization of laser driven particle beams.

In this presentation a report on monitoring systems will be presented.

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