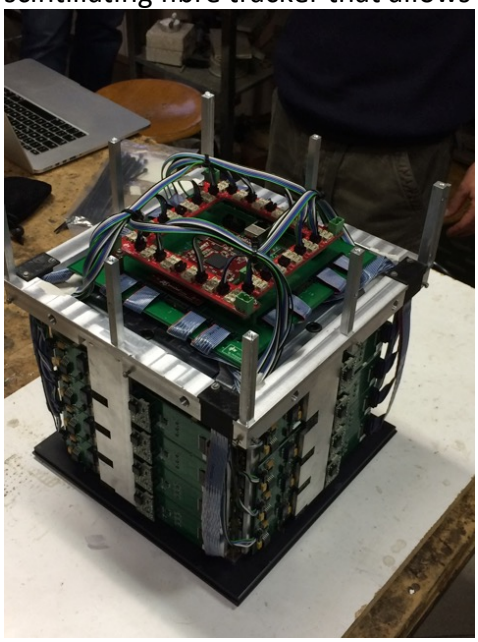
Title: (limit 20 words)

In-room characterisation using an anthropomorphic phantom of a novel light ions PT treatments on-line monitor exploiting secondary charged particles emission
Light ions PT treatment: in-room characterization using an anthropomorphic phantom of a novel monitor exploiting secondary charged particles emission

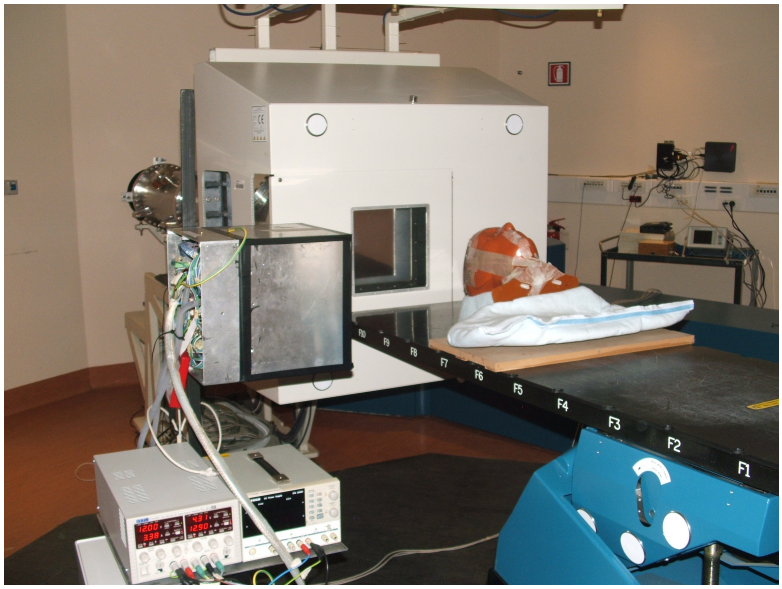
In-room characterization, using an anthropomorphic phantom, of a novel monitor exploiting secondary charged particles emission in light ions PT treatments

Abstract: (limit 250 words)

The use of C, He and O as beam particles when administering Particle Therapy (PT) treatments is getting more and more widespread as a consequence of the enhanced Relative Biological Effectiveness and Oxygen Enhancement Ratio of such projectiles. The advantages in the tumour control probability, related to the improved efficacy of the incoming radiation, require an accurate online monitor of the dose release spatial distribution.
The monitor main purpose is to prevent unwanted damage to the tissues surrounding the tumour that can arise, for example, due to morphological changes occurred in the patient during the treatment with respect to the initial CT scan. PT treatments with C, He and O ions can be monitored by detecting the secondary radiation produced by the primary beam interactions with the patient body along the path towards the target volume. Secondary charged fragments (produced mainly by the projectile fragmentation) can be emitted at very large angles with respect to the incoming beam direction and can be detected with high efficiency in a nearly background free environment. The Dose Profiler (DP) detector, developed within the INSIDE project, is a scintillating fibre tracker that allows an online charged fragments reconstruction and backtracking.



The construction and preliminary tests performed on the DP, carried out using the 12C ions beam of the CNAO treatment centre using a RANDO® anthropomorphic phantom as a target, will be reviewed in this contribution.



A discussion of the results implications for a pre-clinical trial on CNAO patients, foreseen in 2018, will be made.

Short Bio

Member of the Applied Radiation Physics Group of Rome since 2011. Since early 2018 Associated Professor in “Università di Roma La Sapienza”. The main research activities, started in 2010 as a researcher of “La Sapienza” with a research assignment from INFN, are related to the application of High Energy Physics Techniques to Particle Therapy, to study both the interaction of the beam particles with the patient, and the related fragmentation of the target and projectile particles, and to exploit new ways to deploy an ‘on-line’ monitor of PT treatments. The beam fragmentation studies have been performed within the FIRST (2009 - 2016) and FOOT (ongoing) collaborations and are dedicated to the carbon and proton beam induced fragmentation. As a parallel activity, since 2011 and within the INSIDE and RDH collaborations, the study of the production of secondary particles in the beam interactions with different targets have been carried out.