Contribution ID: **89** Type: **poster**

# Monitoring proton therapy through in-beam PET – the perspective of proton therapy physicist

*Tuesday, 25 June 2019 13:30 (1h 30m)*

Proton therapy is a method of radiotherapy allowing the delivery of a high radiation dose to the target volume in a conformal way. This is possible thanks to the very beneficial shape of the depth dose distribution of proton beam, called the Bragg peak.
However, the steep distal fall-off of the beam can result in over- or under-dosage in critical regions. Therefore the monitoring of the beam range is very needed. The one of the method of such monitoring is the in-beam PET system, DoPET developed by the group from Istituto Nazionale di Fisica Nucleare, Sezione di Pisa (Italy). In order of an effective development of this kind of system the cooperation with proton therapy center is necessary. The tests of DoPET were performed, among others, in Cyclotron Centre Bronowice, Institute of Nuclear Physics in Cracow (Poland), which is equipped with two Gantries with pencil beam scanning (PBS) system.
In order to evaluate the capabilities of DoPET several irradiations of different materials phantoms mimicking human tissue have been performed. The experimental conditions were simulated with FLUKA Monte Carlo code. The data analysis was performed focusing on the quantification of the activated volume in terms of depth and signal height.
In this work the experiment will be presented in details, including all issues which have to be solved by the beam provider to convert the treatment parameters into the ones required by the PET system. The comparison of the Monte Carlo predictions vs. experimental data will be shown as well.

**Primary authors:** KRZEMPEK, Dawid (Cyclotron Centre Bronowice, Institute of Nuclear Physics Polish Academy of Sciences, Krakow, Poland.); BATTISTONI , Giuseppe (Istituto Nazionale di Fisica Nucleare, Sezione di Milano, Italy); BELCARI, Nicola (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physics, University of Pisa, Italy); BISOGNI, Giuseppina (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physics, University of Pisa, Italy); CAMARLINGHI , Niccolo (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physics, University of Pisa, Italy.); DEL GUERRA, Alberto (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physics, University of Pisa, Italy.); FERRARI, Alfredo (CERN, Geneva, Switzerland); KOPEĆ, Renata (Cyclotron Centre Bronowice, Institute of Nuclear Physics Polish Academy of Sciences, Krakow, Poland.); KRAAN, Aafke (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy.); KRZEMPEK, Katarzyna (Cyclotron Centre Bronowice, Institute of Nuclear Physics Polish Academy of Sciences, Krakow, Poland.); MORROCCHI, Matteo (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physics, University of Pisa, Italy.); MURARO, Silvia (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy.); OLKO, Paweł (Institute of Nuclear Physics Polish Academy of Sciences, Krakow, Poland.); SALA, Paola (Istituto Nazionale di Fisica Nucleare, Sezione di Milano, Italy.); SPORTELLI, Giancarlo (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physics, University of Pisa, Italy.); TOPI, Albana (Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physical Sciences, Earth and Environment, University of Siena, Italy.); ROSSO, Valeria ( Istituto Nazionale di Fisica Nucleare, Sezione di Pisa, Italy. Department of Physics, University of Pisa, Italy.)

**Presenter:** KRZEMPEK, Dawid (Cyclotron Centre Bronowice, Institute of Nuclear Physics Polish Academy of Sciences, Krakow, Poland.)

**Session Classification:** Poster session