

**EARLY-CAREER
RESEARCHERS IN MEDICAL
APPLICATIONS @ CERN –
SHORT TALKS**

Report of Contributions

Contribution ID: 1

Type: **not specified**

Title: Microdosimetry with GEMTEQ, a novel gas microdosimeter with a highly pixelated readout

Monday 15 June 2020 11:10 (25 minutes)

Abstract: Microdosimetry is the study of the temporal and spatial distributions of absorbed energy in biological matter and is crucial for the deep understanding of radiation effects in human tissue, for example of a carbon ion beam used in cancer treatments. The GEMTEQ detector is based on two CERN technologies, a small triple Gas Electron Multiplier setup with about 9 cm³ active volume and a quad Timepix ASIC featuring more than a quarter million pixels and a pixel pitch of 55 µm. The GEMTEQ is operated with tissue-equivalent gas. First microdosimetric measurements in neutron and photon fields were performed and results obtained with the GEMTEQ were compared to those obtained with standard microdosimeters. The GEMTEQ was also operated as a Time Projection Chamber and the 3D particle track analysis is on-going. In order to further increase the equivalent spatial resolution of the GEMTEQ and to increase the portability of the system, the development of a sealed and low-pressure detector version has started.

Presenter: LEIDNER, Johannes (Rheinisch Westfaelische Tech. Hoch. (DE))

Contribution ID: 2

Type: **not specified**

A Large Area GEMPix detector for treatment plan verification in hadron therapy

Monday 15 June 2020 11:35 (25 minutes)

An advantageous radiation modality for treating cancer is hadron therapy, which at present uses protons and carbon ions. However, treatment with hadrons requires high spatial and dosimetric accuracy in order to achieve optimal dose delivery, which is in turn guaranteed by proper quality assurance (QA) procedures and tools. For this purpose, a promising tool is the LaGEMPix detector that combines a triple GEM (Gas Electron Multiplier) with a matrix of organic photodiodes coated on an oxide thin film transistor (TFT) backplane. A first prototype of the LaGEMPix with an active area of 60 x 80 mm² and pixels of 126 x 126 μm² has been successfully built and tested with X-rays as a preliminary step towards the development of a 20 x 20 cm² detector.

Presenter: MAIA OLIVEIRA, Andreia Cristina (FCT Fundacao para a Ciencia e a Tecnologia (PT))

Contribution ID: 3

Type: **not specified**

Introduction

Monday 15 June 2020 11:00 (10 minutes)

Presenter: SILARI, Marco (CERN)