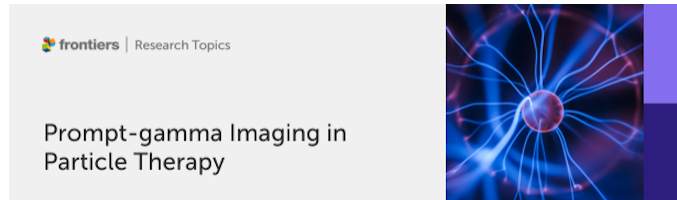


Prompt Gamma Imaging in Particle Therapy



Contribution ID: 5

Type: **Oral**

Positron Enhanced Prompt Gamma Imaging with a Modular CdZnTe Compton Camera

Thursday, 6 July 2023 14:45 (30 minutes)

This work introduces a Positron Enhanced Prompt Gamma Imaging (PEPGI) technique to improve the image reconstruction from a CdZnTe Compton Camera for use in dose reconstruction during proton therapy. PEPGI uses coincidence 511 keV gamma rays emitted from a target to locate the proton beam line using a PEPT-style algorithm, which is then used to improve Compton Camera Prompt Gamma Imaging (PGI) through Distance of Closest Approach (DCA) filtering. This filter eliminates noisy data by removing reconstructed gamma ray events that do not originate close to the proton beam line. The proposed method consists of three CdZnTe detectors configured to combine a dual head Compton Camera with a face to face detector setup in order to detect back-to-back 511 keV gamma ray pairs produced during positron annihilation. In this study, Monte-Carlo simulations, using the Geant4 toolkit, were used to verify the PEPGI process for proton therapy scenarios, in preparation for forthcoming measurements. This method should make image reconstruction more efficient and will require less data to produce.

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