Contribution ID: **77**　　　　　　　　　　　　　　　　　　　　Type: **not specified**

First experimental hybrid Compton-PET imaging for ion-range monitoring in hadron therapy

Two of the most promising methodologies for in-room real-time ion-range monitoring are positron-emission tomography (PET) and prompt-gamma imaging (PGI). Owing to the prompt-nature of the emitted radiation, range verification via PGI is well suited for real-time monitoring [Ler22], whereas PET imaging can provide tomographic and functional information relevant to study physiological processes and tumor response.

The method that we have implemented is based on the hybrid combination of both PGI and PET within the same system [Bal22], thus exploiting the advantages of them both. This is accomplished by means of an array of Compton cameras in a twofold front-to-front configuration operating in synchronous mode.

In this contribution I will present a summary of a proof-of-concept experiment performed at CNA-Sevilla and first results from the HIT-Heidelberg facility where clinical conditions were used to validate the hybrid technique with protons, alpha and C ion beams.

[Ler22] J. Lerendegui-Marco et al., "Towards machine learning aided real-time range imaging in proton therapy", Sci Rep 12, 2735 (2022). https://doi.org/10.1038/s41598-022-06126-6

[Bal22] J. Balibrea-Correa et al., "Hybrid in-beam PET- and Compton prompt-gamma imaging aimed at enhanced proton-range verification", The Eur. Phys. Jour. Plus, Volume 137, Issue 11, article id.1258 (2022) https://doi.org/10.1140/epjp/s13360-022-03414-y

Author: BALIBREA CORREA, Javier (Univ. of Valencia and CSIC (ES))

Co-authors: FERNANDEZ MARTNEZ, Begona; GUERRERO SANCHEZ, Carlos (Universidad de Sevilla (ES)); DOMINGO PARDO, Cesar (Univ. of Valencia and CSIC (ES)); LADARESCU PALIVAN, Ion (Univ. of Valencia and CSIC (ES)); LERENDEGUI MARCO, Jorge (Univ. of Valencia and CSIC (ES)); QUESADA MOLINA, Jose Manuel (Universidad de Sevilla (ES)); Dr JIMENEZ RAMOS, Maria Del Carmen (Universidad de Sevilla (ES)); RODRIGUEZ GONZALEZ, Teresa; BABIANO SUAREZ, Victor

Presenter: BALIBREA CORREA, Javier (Univ. of Valencia and CSIC (ES))

Session Classification: CPAN - Investigación orientada, tecnología e innovación

Track Classification: CPAN - Investigación orientada, tecnología e innovación