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Cherenkov TOF-PET module performance using HRFlexToT electronics

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The quality of positron emission tomography reconstructed images can be increased by improving the time-of-flight measurement, which is mainly limited by the time response of the standard scintillators (e.g., LYSO, BGO). Another possible option to develop new devices is to use Cherenkov light emitted by electrons moving with velocities exceeding the speed of light in the chosen radiator material. One open question of Cherenkov TOF-PET is how to extend the performance obtained with a small amount of individual PbF₂ crystals and SiPMs using modular electronics to crystal and SiPM arrays using a multi-channel readout capable of covering the necessary surface for a clinical whole-body PbF₂ TOF-PET scanner. In this work, the feasibility of Cherenkov TOF-PET beyond proof-of-concept experiments using individual crystals was explored. In that sense, the recently developed HRFlexToT electronics was used to experimentally reconstruct images on the scale of two 16 channel Cherenkov TOF-PET modules.

Topic Selection

Technical Advances in brain imaging

Author: CONSUEGRA RODRÍGUEZ, Dania (J. Stefan Institute)

Co-authors: RAZDEVSEK, Gasper; KRIZAN, Peter; DOLENEC, Rok (Jozef Stefan Institute (SI)); PESTOTNIK, Rok (Jozef Stefan Institute (SI)); KORPAR, Samo

Presenter: CONSUEGRA RODRÍGUEZ, Dania (J. Stefan Institute)

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