

Hyperion III –MRI-Compatible PET Detector Platform

Tuesday, 31 May 2022 10:10 (20 minutes)

Commercially available PET/MRI scanner have been designed as whole-body systems. In these, PET spatial resolution and sensitivity are limited. Dedicated PET inserts can potentially overcome these limitations, but every application, e.g., neuro, breast, or preclinical, has different requirements.

A PET detector platform for simultaneous PET/MRI was thus designed, providing the needed flexibility to construct different systems. Different detector technologies shall be usable to detect scintillation light from the PET detector crystals. The first implementation of a sensor tile uses DPC-3200 sensors from PDPC. It offers 144 channels in a sensitive area of approx. 48×48 mm². The integration of analog SiPM/ASIC combinations, e.g., using the PETSys TOFPET2 ASIC is currently planned. The sensor tiles are connected with flexible cables to the detector mother boards. Cable lengths of up to 5 m were tested successfully. Each mother board supplies up to 15 sensor tiles and transmits their data via 10-Gigabit Ethernet to a data acquisition and processing server. There, the raw data is either stored for later analysis –e.g., for system calibration –or directly processed and saved as a listmode file.

The different PET systems are configured and controlled with a separate control software, providing a graphical user interface.

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Session Classification: New technologies for PET/MR and TB-PET

Track Classification: New technologies for PET/MR and TB-PET