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SmartPET: A Small Animal P.E.T Demonstrator using HyperPure Germanium Planar Detectors

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The SmartPET project aims to exploit advances in the sensitivity, speed, position and energy resolution of HPGe detectors to construct a small animal Positron Emission Tomography (PET) system.

The small animal scanning system will consist of two planar HPGe detectors separated by 109mm and housed in a rotating frame allowing data acquisition over a full 180° range. Each detector will have a 60x60x20mm crystal electrically segmented with 5mm strip pitch. The development of sophisticated digital acquisition techniques and the use of Pulse Shape Analysis (PSA) and Gamma Ray Tracking (GRT) will allow accurate position and energy information to be extracted.

The techniques outlined allow scattered interactions to be identified and used for image reconstruction and therefore hold the potential to increase patient throughput and/or reduce patient dose.

This coupled with investigation into the use of three dimensional statistical image reconstruction aims to provide proof of principle for the use of germanium detectors in medical imaging applications.

This poster will provide an overview of the SmartPET project, its potential as a PET system and the advantages it holds over conventional systems. Preliminary results will also be presented.

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