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# SmartPET Image Reconstruction Techniques and Results

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The SmartPET project will examine the possibility of using planer Hyper Pure Germanium Detectors (HPGe) within a Positron Emission Tomography (PET) system. This system is designed to image small animals.

The image reconstruction algorithms take measured or simulated projection data of an underlying radioactive source distribution and attempt to produce an accurate 2D or 3D image of this distribution.

Two main groups of algorithm exist, analytical methods such as Filtered Back Projection (FBP) and statistical methods such as Maximum Likelihood Expectation Maximization (ML-EM). Each algorithm has advantages and disadvantages; often the trade-off is between the quality of the final image and the computational power needed to produce it.

This presentation will provide an overview of the image reconstruction process from collection of the projection data (sinogram) to the use of this data in forming an image using either FBP or ML-EM. Example reconstructed images will be shown for both simulated and preliminary experimental data from the SmartPET system.

**Author:** Mr MATHER, Andrew (University of Liverpool)

**Presenter:** Mr MATHER, Andrew (University of Liverpool)

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