

## Filter's Importance in Nuclear Cardiology Imaging

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### Abstract

Nuclear Medicine is a medical speciality which employs tomography procedures for the diagnosis, treatment and prevention of diseases. One of the most commonly used apparatus is the Single Photon Emission Computed Tomography (SPECT).

To perform exams, a very small amount of a radiopharmaceutical must be given to the patient. Then, a gamma camera is placed in convenient positions to perform the photon counting, which is used to reconstruct a full 3 dimensional distribution of the radionuclide inside the body or organ. This reconstruction provides a 3-dimensional image in spatial coordinates, of the body or organ under study, allowing the physician to give the diagnostic

Image reconstruction is usually worked in the frequency domain, due to a great simplification introduced by the Fourier decomposition of image spectra. After the reconstruction, an inverse Fourier transform must be applied to trace back the image into spatial coordinates.

To optimize this reconstruction procedure, digital filters are used to remove undesirable components of frequency, which can “shadow” relevant physical signatures of diseases. Unfortunately, the efficiency of the applied filter is strongly dependent on its own mathematical parameters.

In this work we demonstrate how filters interfere on image quality in cardiology examinations with SPECT, concerning perfusion and myocardial viability and the importance of the medical physicist in the choice of the right filters avoiding some serious problems that could occur in the inadequate processing of an image damaging the medical diagnosis.

**KEYWORDS:** *nuclear medicine, image reconstruction, cardiology, filter.*

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