

Identifying contrast agents based on high-Z elements in multi-energy computed tomography

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One of the main goals of developing a new multi-energy X-ray tomograph is the recognition of materials using spectral information. The Medipix and Timepix series detectors are one of the pixelated semiconductor hybrid detectors developed in Medipix collaboration. These detectors have high spatial resolution and are capable of detecting radiation over a wide energy range. It makes possible to use this detectors in multi-energy computed tomography.

This work demonstrates the possibility of using the Medipix3RX and Timepix3 detectors to obtain energy information that can be used to distinguish various substances in multi-energy tomography. Some results of applying the developed criterion for identifying contrast agents on phantom objects containing various concentrations of elements with a high Z number, such as La, Nd, Gd and I, are also presented. This criterion was tested based on the energy information presented in the form of 2D images and 3D reconstructions. The criterion also allows one to evaluate the concentrations of contrast agents in the studied samples.

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