Imaging performance study of the quantum X-ray scanner based on GaAs detectors

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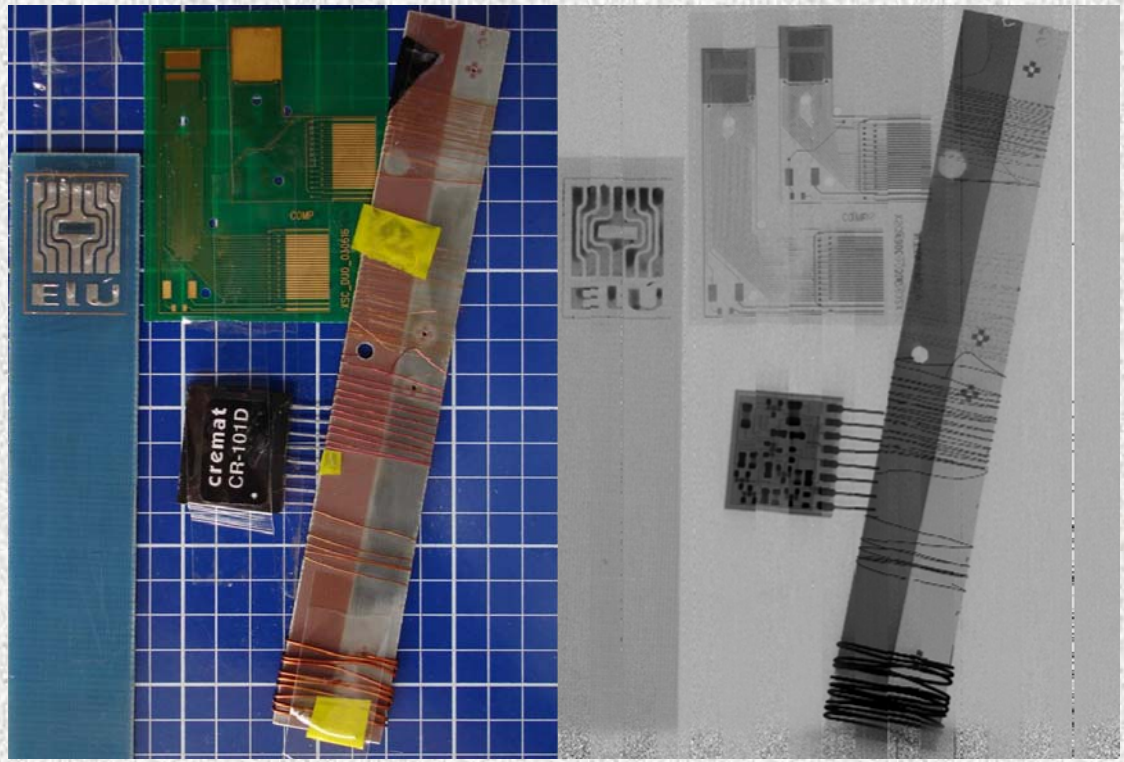
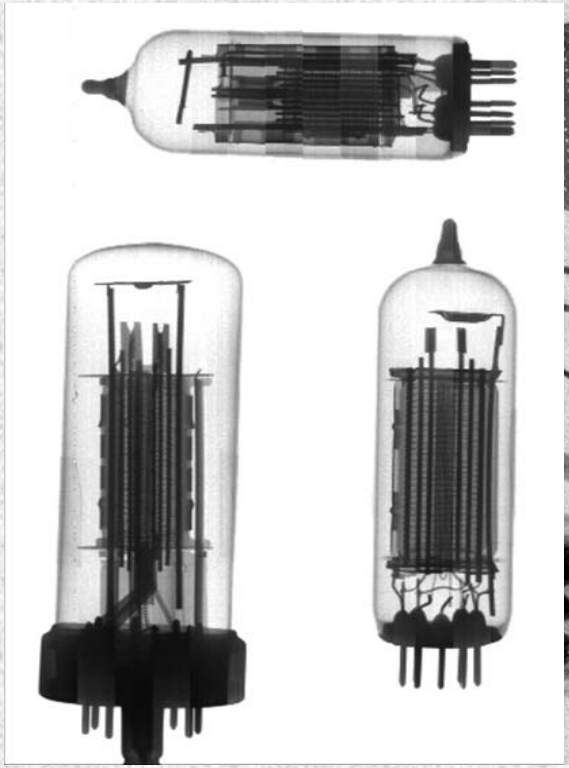


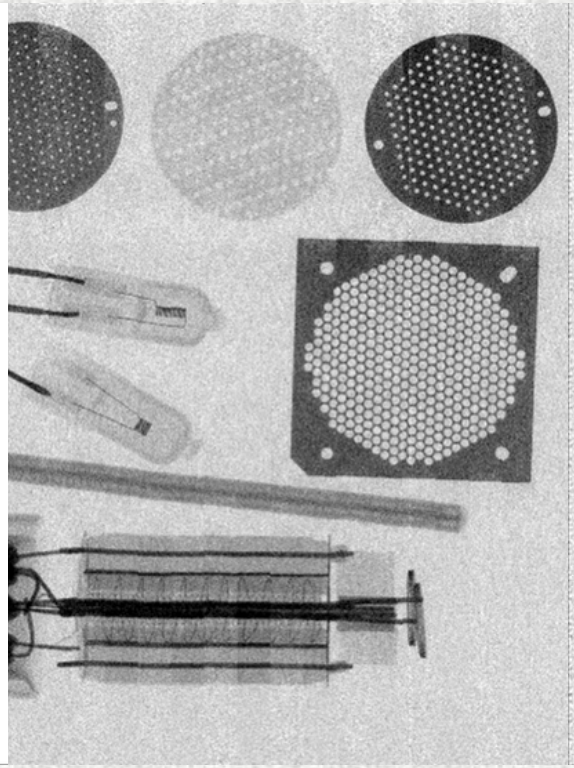
36 kV/25 mA, 500ms

This work is devoted to a more detail testing of overall imaging performance of the digital quantum scanner with enhancement of the line step from original 250 down to 85 μm. In particular its spatial resolution, resolution in contrast and imaging ability through evaluation images revealed with various testing objects (including biological) are performed. For irradiation a X-ray tube of diffraction apparatus is used. Initial study toward imaging of a low contrast objects using energy separation technique is presented. The obtained results are discussed in the scope of published results.

70 kV/8 mA, 50ms

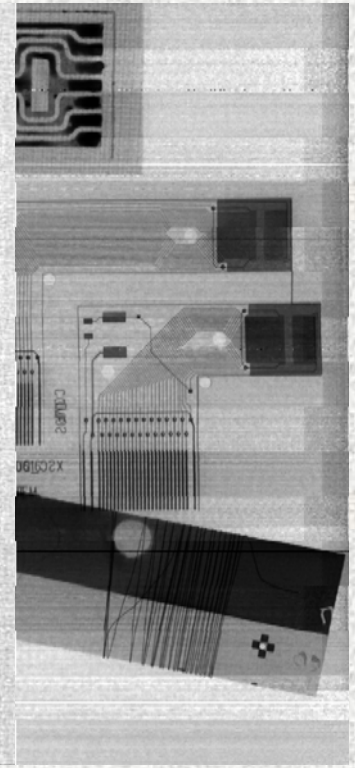


90 kV/0.2 mA, 50ms



70 kV/8 mA, 1000ms

36 kV/25 mA, 1500ms



Developed portable digital X-ray scanner based on a low cost SI GaAs detectors works in quantum counting operation mode. Developed SW includes basic imaging with data corrections and allows applicability of the apparatus as confirms demonstrated X-ray images of selected test objects. The spatial resolution of the X-ray scanner is limited by used pitch of detector (0.25 mm) in one direction. In other direction (direction of line moving) spatial resolution is for the moment limited by the lowest available line step 85 μm. Getting a good X-ray picture at 36 kV of X-ray tube shows possibility of operation with low energy X-rays. Portable digital X-ray scanner is also capable of taking good X-ray picture using low dose radiation (current of X-ray tube about 0.2 mA and 50ms for readout of one line.

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