Proceedings of the 8th World Congress on New Technologies (NewTech'22)
Prague, Czech Republic– August 03-05, 2022
DOI: 10.11159/icnfa22.004

Multi-Pixel Field Emission Based X-ray Generators

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Abstract

The first concept of multi-source Computed Tomography (CT) systems originated in the 1980s, and opened the way to innovative system concepts in X-ray and computed tomography. Multi-source CT systems offer promising opportunities in system performance. In addition, multi-source X-ray radiographic systems are widely studied, namely for X-ray stereographic imaging, X-ray tomosynthesis imaging, and inverse-geometry imaging. One significant benefit of the multi-source X-ray technology is the ability to fabricate the source array in various two-dimensional configurations. The more complicated distributive source topologies are designed to improve the sampling of projection data, to further improve both in-plane and depth imaging resolution within the constraints of the limited-angle acquisition of projection data. In multi-source systems, the X-ray sources are arranged in an array format, and each source is launched individually. However, current X-ray generators are not suited for these systems because of their large size, huge power requirement, and slow response. This talk will focus on the field emission X-ray technology that enables to the realization of multi-source CT systems.