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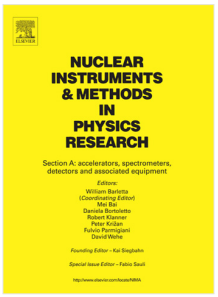

3D reconstruction of radioactive sample utilizing gamma tomography

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3D reconstruction of radioactive sample utilizing gamma tomography

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Abstract

Unique three-dimensional (3D) tomography apparatus was developed and successfully tested at Research Centre Rez, which concentrates at investigation of the degradation of microstructural and mechanical properties of structural materials of nuclear reactors components after a long-term operating exposure. The apparatus allows a 3D view into the interior of low-dimension radioactive samples with a diameter up to several centimeters and a resolution in order of cubic millimeters. It is designed to detect domains with different levels of radioactivity such as cavities, cracks or regions with different chemical composition.

The unique collimator design, the use of stepper motors for fine and accurate sample scanning, along with advanced 3D image reconstruction software developed at Research Centre Rez, enables a resolution approaching 1 mm^3.

Devices working on a similar principle have been used for decades, e.g., in nuclear medicine for the diagnosis of malignant tumors, and are increasingly being applied in the nuclear industry. However, for the first time similar equipment

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