

Spatial calibration of scintillator for proton radiography

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Proton radiography with special magnetic optic is a powerful tool for nondestructive testing of static and dynamic objects. It is suitable for investigation of high explosive driven phenomena such as equation of state, phase transitions, material strength. We report details on spatial calibration of system for registration of radiography images at the proton microscope at the NRC Kurchatov Institute-ITEP. The procedure is based on least-square fitting of an image of a diffused proton beam with a two-dimensional Gaussian function. It was applied for correcting raw radiographs due to spatial nonuniformity of a scintillator and digital high-speed cameras. The defined variability of proton beam parameters from pulse to pulse is obtained. The normalized proton radiographs of static objects and explosive driven processes are also presented.