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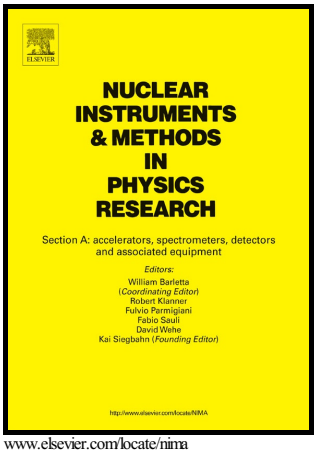

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Optimization of a femtosecond laser generated x-ray source for pulsed radiography

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Abstract

X-ray radiography is an important tool in medicine as well as in life science and materials science. It is Kα radiation that is of primary interest in the fields of x-ray diffraction, whereas the whole x-ray flux receives most attention in the x-ray imaging application. We present a general Monte Carlo model of x-ray generation in femtosecond laser-irradiated solid material. Bremsstrahlung radiation is taken into account explicitly, permitting both whole x-ray and Kα emission to be calculated for arbitrary experimental conditions (i.e. target material, target thickness, target shape as well as laser intensity). The optimal thickness of both the whole x-ray and Kα emission from Titanium (Ti) foils irradiated with femtosecond laser pulse has been