

Characterization Of X-rays Pulses From A Hundred Joules Plasma Focus To Study Its Effects On Cancer Cells

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With the purpose to study the effects of pulsed x-rays radiation on biological cells, in particular cancer cells, the total doses of x-ray pulses and the temporal duration of the pulse has been characterized in a hundred joules plasma focus device (PF-400J, 130 kA achieved in 300ns). TLD dosimeters were located outside of the discharge chamber, at 96 mm from the anode top. In addition, two photomultipliers with plastic scintillator were located in axial and radial directions. Several sequences of accumulative shots were obtained (260, 380, 980 shots). From the statistical analysis of the TLD and photomultiplier signals was possible to estimate that a single shot have a total dose in the order of $30 \pm 15 \mu\text{Sv}$ with a duration of the order of $12 \pm 3.6 \text{ ns}$ at FWHM. Preliminary experiments using MCF7, a breast cancer cell line, were performed. Cells were irradiated at 96 mm from the anode top with 260, 380 and 980 cumulative x-ray shots and cell survival was evaluated at 24, 48 and 72 hours later. The effects are compared with cells irradiated with equivalent total dose by a continuous x-ray source. Supported by grant ACT-1115, CONICYT, Chile.