

Comparison of pulsed x-ray doses obtained from a hundred joule and a kilojoule plasma focus device

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Abstract

Recently plasma focus devices have been used as a pulsed x-ray source to irradiate biological samples [1-3]. Such applications require dose measurements. In addition to that, it will be useful to study the relationship between the stored energy and dose for scaling purposes. In the present work, two different plasma focus devices 1) hundreds of joules (multipurpose), and 2) kilojoules (PF-2kJ) were adopted for dose measurements. The former device is a multipurpose facility that can be modified to operate at different configurations such as x-pinch, and plasma focus device. In the present work, it is operated as a plasma focus device of hundreds of joules of input energy. To measure the doses, arrays of thermoluminescent dosimeters TLD-100 were used and kept at a distance of ~5 cm from the anode top in both cases. The doses obtained for the multipurpose device were ~1.2 Gy, 0.38 Gy, and 0.17 Gy for 40, 20, and 10 x-ray pulses respectively. In the case of PF-2kJ, ~ 0.63 Gy dose was obtained for 10 x-ray pulses. Both devices' electrode geometries were different than the conventional geometries. The details will be presented and discussed in the symposium.

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