ENERGY TRANSFER EFFICIENCY OF A PULSED INDUCTIVE DISCHARGE

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A pulsed inductive plasma source for VUV generation and plasma stripper applications with an operating frequency of 12 kHz has been developed. The setup consists of a series resonance circuit with a load capacitance of 27 µF and a large diameter induction coil surrounding a spherical discharge vessel with a discharge volume of 4000 ml. Measurements have been made to evaluate the transfer efficiency of the pulsed inductive discharge in Argon with 2.8% Hydrogen at gas pressures from 0.6 Pa up to 100 Pa at load voltages from 4 kV to 8 kV. Pulsed coil currents reached a maximum value of 18 kA with current rise times of 2 kA/µs while achieving a maximum energy transfer efficiency of 85% between the driving circuit and the plasma. Pulsed power peak values inside the plasma were higher than 2 MW fore pulse energies of 1kJ. The experimental evidence suggests that the high transfer efficiency obtained with the spherical theta pinch is due to the improved transformer coupling between primary circuit and discharge plasma.