Abstract Submitted
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Optimized Nanosecond Transient Plasma Impedance Matching of cylindrical corona-plasma reactors energized by fast rising nanosecond pulses[1] SRIRAM SUBRAMANIAN, Univ of Southern California, TOM HUISKAMP, Technische Universiteit Eindhoven, VYAAS GURURAJAN, JAGAN JAYACHANDRAN, ALEC NYSTROM, WILLIAM SCHROEDER, STEPHEN CRONIN, MARTIN GUNDERSEN, Univ of Southern California — Transient plasma requires efficient coupling or impedance matching of electrical elements to avoid plasma pulse distortion.In this presentation we review the simulation, design and experimental verification of the impedance-matching characteristics of two 13 cm diameter, 3 meters long stainless steel corona-plasma reactors with the purpose of optimizing the energy efficiency of a pulsed corona plasma system for environmental applications such as NO remediation.The reactors are fitted with multiple wire electrodes running along the axis of the two reactors.We experiment with cross sectional diameters of these multi wire electrodes and the no.of wires to arrive at the configuration that yields the greatest energy deposition and as a result, the best matching into a non-thermal plasma.For our pulse source, we use an inductive adder based unit,manufactured by Transient Plasma Systems Inc,who supplied a 7-ns rise time,50-kV pulse into a matched load with approximately 500 mJ/pulse into a matched load.The basis for our experiments was formed by calculation of the inductance and capacitance of these electrode systems to estimate the characteristic impedance of the same. These were then simulated and experimentally verified.

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