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## DESIGN AND PERFORMANCE OF AN 8 LINE GYROMAGNETIC NONLINEAR TRANSMISSION ARRAY

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DESIGN AND PERFORMANCE OF AN 8 LINE GYROMAGNETIC NONLINEAR TRANSMISSION ARRAY

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This paper discusses the design, fabrication, and performance of an eight element, coaxial ferromagnetic Non-linear Transmission Line (NLTL) used as a high power microwave (HPM) source. To start precession in the lines a 10.4 nF capacitor bank is charged to -40 kV from two 802L TDK Lambda power supplies. A center pin trigatron is used to trigger the spark-gap discharging the capacitors. The trigger generator used is optically isolated and battery powered, producing a positive polarity pulse at 20 kV with a 20 ns risetime. The spark-gap simultaneously outputs to all eight NLTL's. Preceding the 77 cm main lines are eight 32 cm lines used to delay the pulse allowing propagation speed adjustments between the lines to ensure proper phasing at the output. The lines use NiZn ferrites with SF6 insulation. Each NLTL terminates into a custom Rexolite-filled, TEM horn antenna using a zipper balun. The system is operated using a PLC control system. Experimental observations include in-line measurements of voltage waveforms and radiated D-dot field measurements.

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