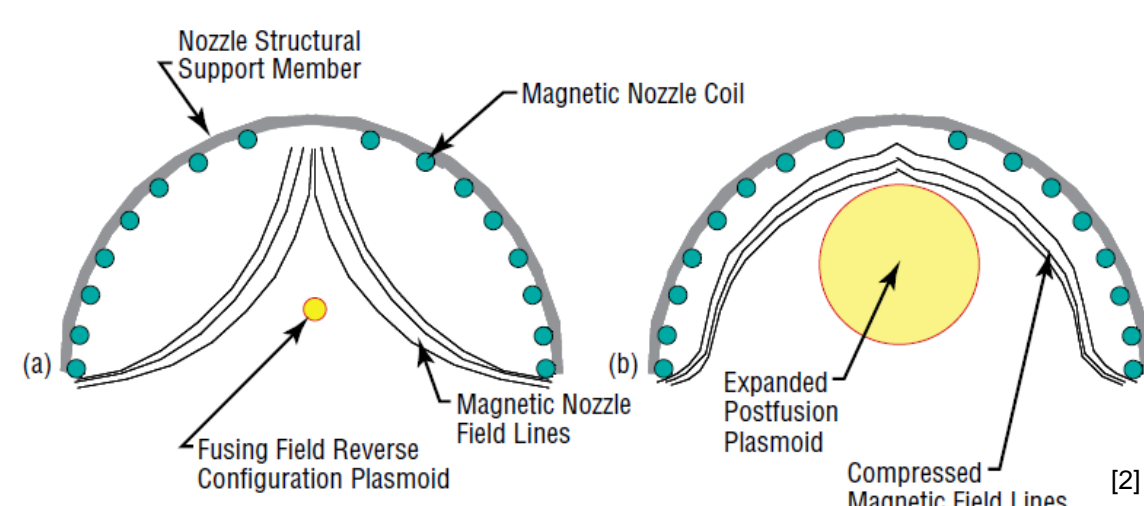
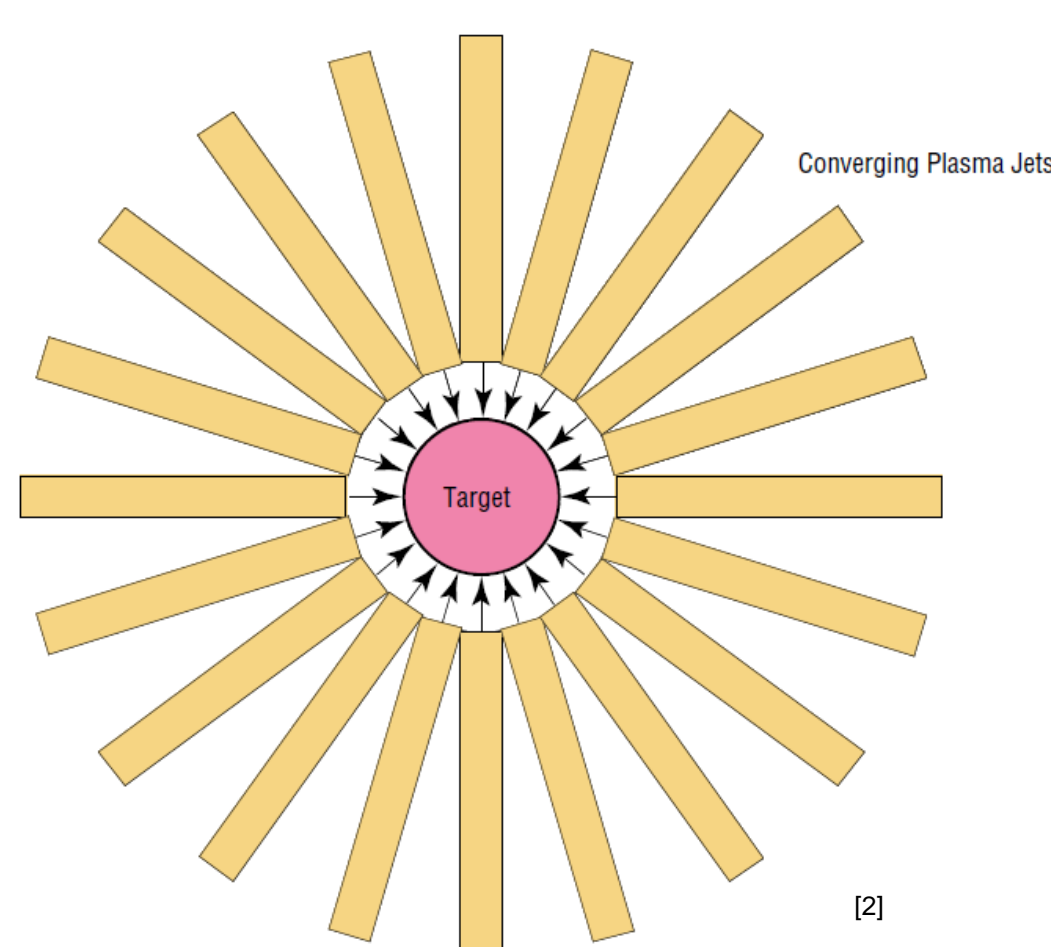
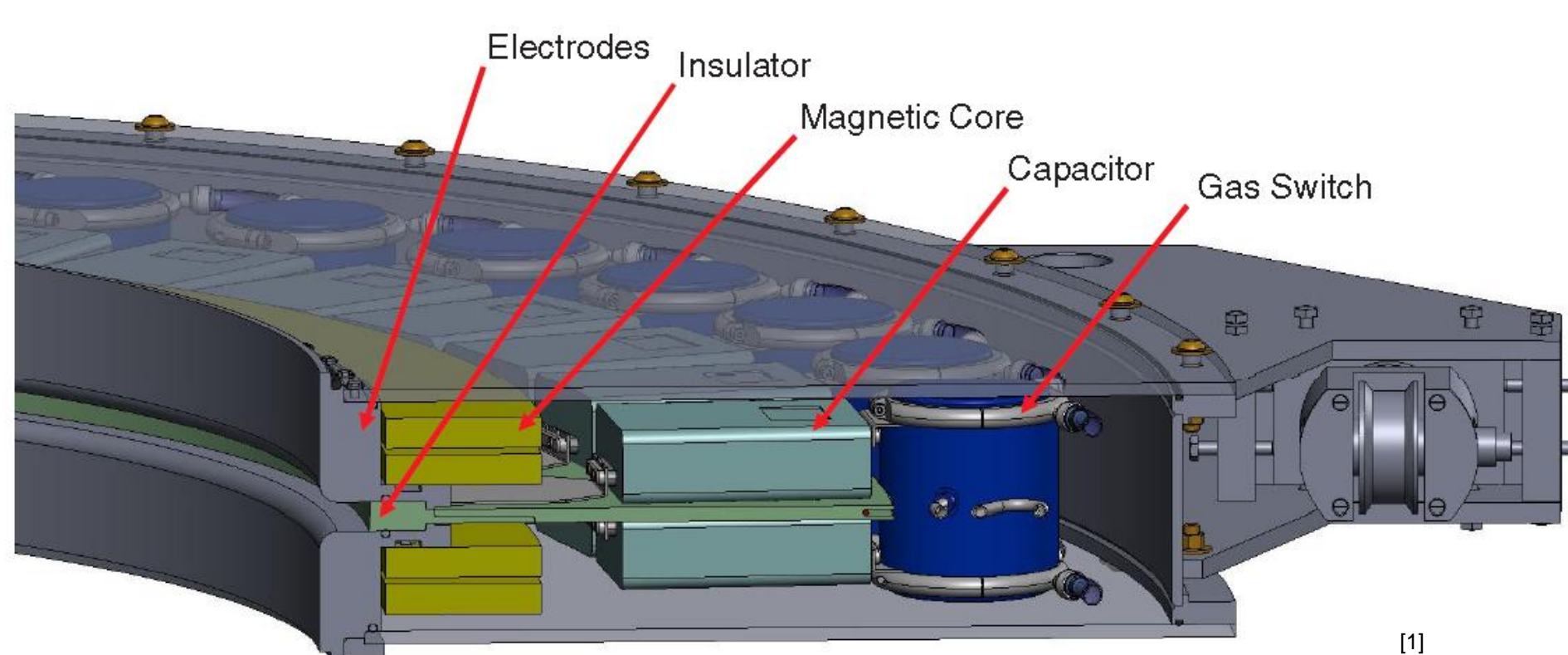


ANALYSIS OF STACKED LINEAR TRANSFORMER DRIVERS FOR APPLICATION IN NUCLEAR FUSION PROPULSION

Patrick Giddens, MAE Department

Overview

This poster will discuss the analysis of stacking Linear Transformer Drivers (LTD) as the primary pulse power generator for a nuclear fusion propulsion system.

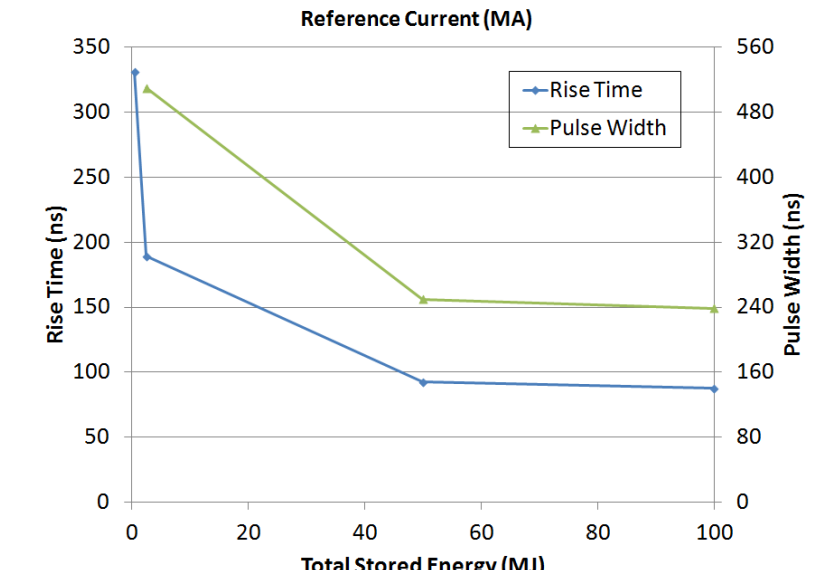
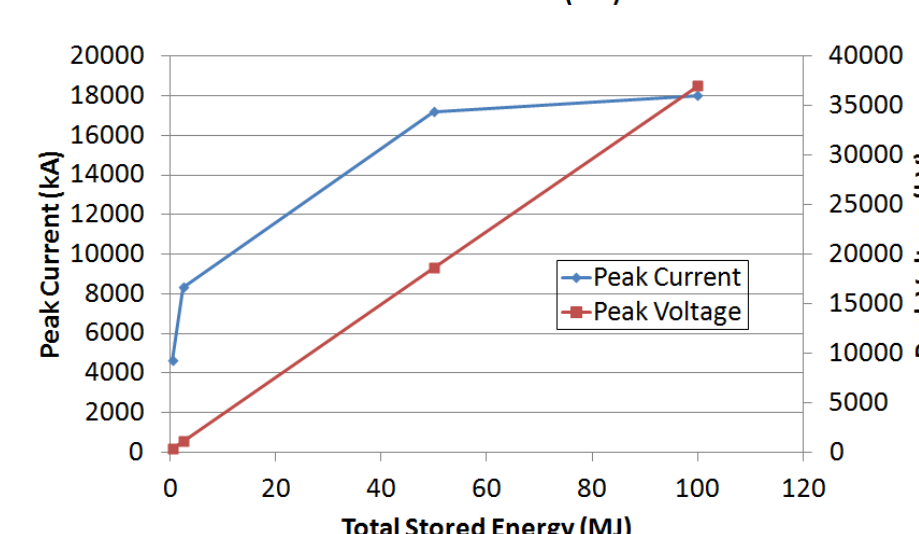
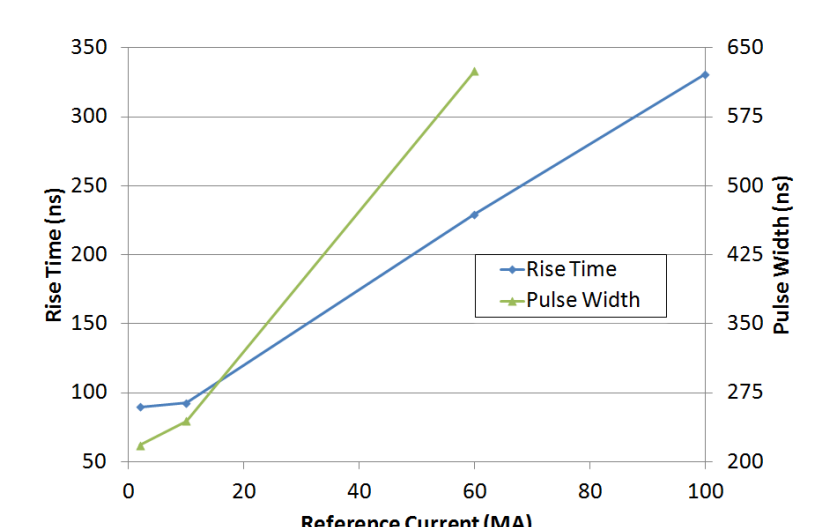
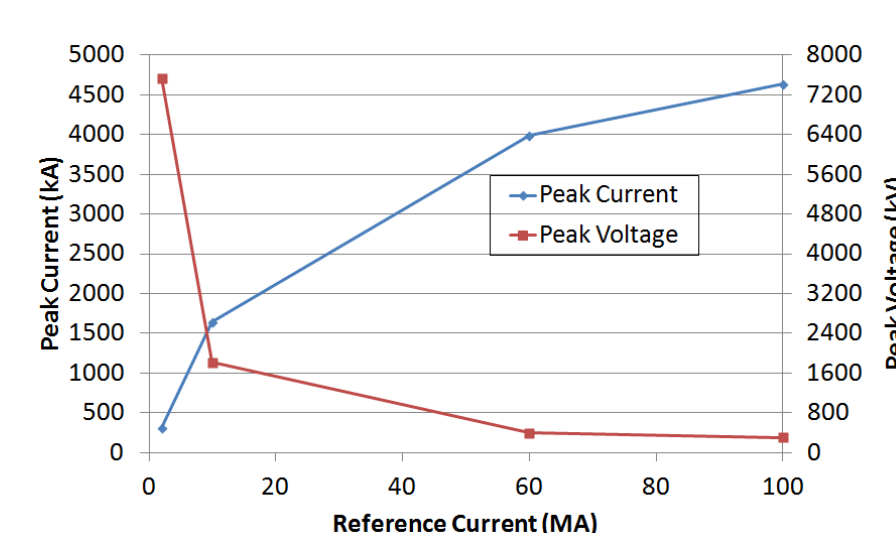
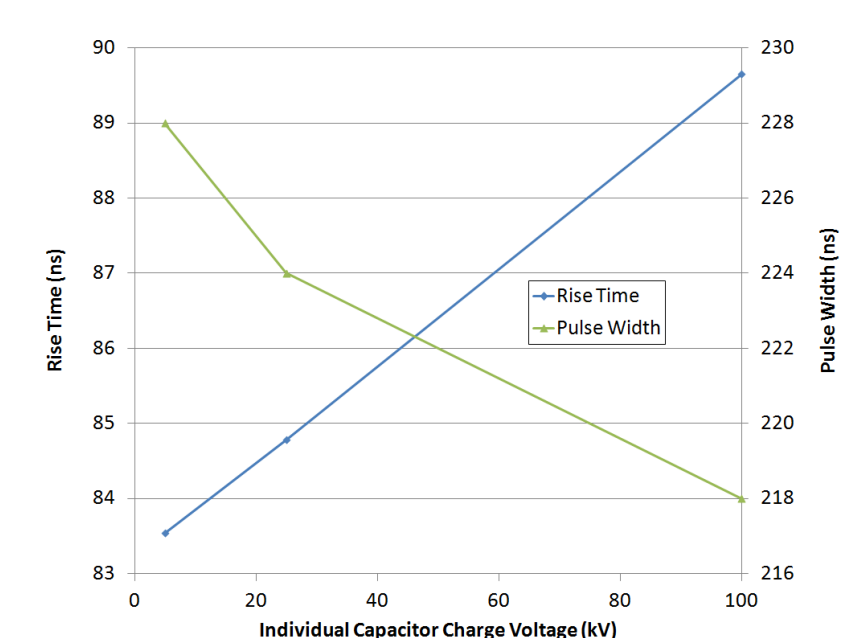
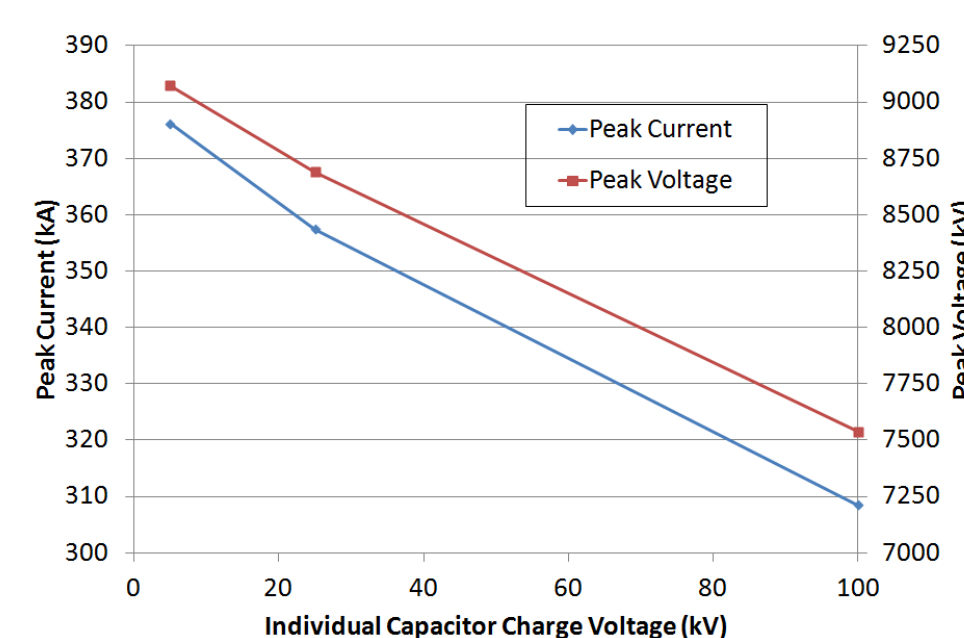


Impact

This was the first step in understanding how LTDs might scale up to obtain the power required for use in UAHuntsville future fusion propulsion flight demo hardware.

Key Findings

	Group 1	Group 2	Group 3
Constant parameters	2 MA current	100 kV charge	100 kV charge
	500 kJ energy	500 kJ energy	100 MA current
Variable parameters	5 kV charge	2 MA current	500 kJ energy
	25 kV charge	10 MA current	2.5 MJ energy
	100 kV charge	60 MA current	50 MJ energy
	-	100 MA current	100 MJ energy

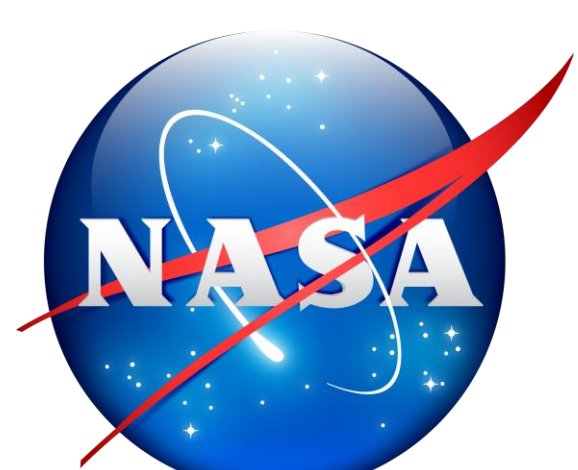


Explanation

This research helps to bring fusion propulsion one step closer. This will allow us to get a first hand look at our galaxy.

Acknowledgements

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[1] D.V. Rose, C.L. Miller, D.R. Welch, R.E. Clark, E.A. Madrid, C.B. Mastrom, W.A. Stygar, K.R. LeChien, M.A. Mazarakis, W.L. Langston, J.L. Porter, J.R. Woodworth, "Circuit models and three-dimensional electromagnetic simulation of a 1-MA linear Transformer driver stage" DOI: 10.1103/PhysRevSTAB.13.090401

[2] R.B. Adams, Alexander, R.A., Champman, J.M., Fincher, S.S., Hopkins, R.C., Philips, A.D., Polsgrove, T.T., Litchford, R.J., Patton, B.W., Statham, G., White, P.S., and Thio, Y.C.F., "Conceptual Design of In-Space Vehicles for Human Exploration of Outer Planets," NASA/TP-2003-212691, 2003.