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Field-Distortion Air-Insulated Switches for Next-Generation Pulsed-Power Accelerators

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We have developed two advanced designs of a field-distortion air-insulated spark-gap switch that reduce the size of a linear-transformer-driver (LTD) brick. Both designs operate at 200 kV and a peak current of ~50 kA. At these parameters, both achieve a jitter of less than 2 ns and a prefire rate of ~0.1% over 5000 shots. We have reduced the number of switch parts and assembly steps, which has resulted in a more uniform, design-driven assembly process. We will characterize the performance of tungsten-copper and graphite electrodes, and two different electrode geometries. The new switch designs will substantially improve the electrical and operational performance of next-generation pulsed-power accelerators.

Author: WISHER, Matthew (Sandia National Laboratories)

Co-authors: Mr BREDEN, Eric (Sandia National Laboratories); Mr CALHOUN, Jacob (Sandia National Laboratories); GRUNER, Frederick (Kinetech LLC); Mr JOHNS, Owen (Sandia National Laboratories); MULVILLE, Thomas (Sandia National Laboratories); STOLTZFUS, Brian (Sandia National Laboratories); STYGAR, William (Sandia National Laboratories)

Presenter: WISHER, Matthew (Sandia National Laboratories)

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