

Public Abstract
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Implementation of the University of Missouri Terawatt Test Stand and the Study of a Large,
Multichanneling, Laser Triggered Gas Switch*
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The University of Missouri Terawatt Test Stand is a 2.5 MV, 200 kA test bed primarily constructed for research into large laser triggered gas switches. It is one of the world's largest university operated pulsed power facilities and provides a valuable resource for experimentation in areas ranging from component evaluation to wire array physics. The initial directive at the facility was to research ways to improve switching characteristics and investigate impedance lowering methods in multichanneling gas switches.

Laser triggered gas switches are used in large accelerators, such as the Z machine at Sandia National Laboratories, as primary switching elements between energy storage and transmission line sections. Down line from these gas switches are self-breaking water switches. Water switches are problematic and replacing them in these large accelerators with more robust and reliable gas switches is desired. One draw back to replacement is that SF₆ gas switch designs that are currently utilized are more inductive and switch more slowly than water switches. Slow switching is not preferred and an investigation was required improving the inductance characteristics of gas switches, which was completed in this work.

This work was conducted on Rimfire, a multigap, multichanneling, laser triggered gas switch. Switch parameters were iterated to investigate their influence on multichanneling and, in turn, their effects on switch impedance. Experiments presented are the first of their kind and apply to the future design of low impedance, high voltage, gas switches.

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