

# RUNTIME AND JITTER OF A LASER TRIGGERED GAS SWITCH

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## ABSTRACT

The University of Missouri has studied parameters affecting the runtime and jitter of a laser triggered gas switch. Experiments tested a variety of switch parameters including percentage of self-break and charge voltage. The effects of laser beam parameters were also considered, including focal length, laser energy and laser spark length.

Experiments were performed on the Tiger pulsed power machine. Measurements were taken on a spark gap switch built from the trigger section of a Rimfire switch. A Marx bank consisting of 32, 3.1 uF, capacitors that feeds into a 7 nF intermediate storage capacitor drives the switch into a 4  $\Omega$  resistive load. The test switch was pressurized with SF6 and operated near 1 MV. A 30 mJ, 266 nm, Nd:YAG laser was used to trigger breakdown of the switch. The laser was focused at the mid-gap between the electrodes using lenses with focal lengths between 30 cm and 100 cm. Focused laser energy in the switch ranged from <5 mJ to 20 mJ.

The effects of switch and laser beam parameters on the runtime and jitter of a laser triggered gas switch are presented. The end goal of the research is to determine optimal conditions for improved switch performance.