

Brian Hutsel, Electrical Engineering

Year in School: Senior

Hometown: Manchester, MO

Faculty Mentor: Dr. Scott Kovaleski, Electrical & Computer Engineering

Funding Source: College of Engineering Undergraduate Research Option

Characterization of runtime and jitter on a megavolt laser triggered spark gap switch

Brian Hutsel & Scott Kovaleski

Laser triggering has been utilized in spark gap switches to initiate switch breakdown resulting in more reliable and repeatable switching. Many studies have focused on how various parameters of the switch or the laser triggering system affect the timing of the breakdown in an attempt to minimize the jitter associated with the switch. In preparation for a future study characterizing runtime and jitter with respect to switch and laser parameters, an extensive literature review of laser triggered spark gap switches has been completed. The focus of the study has consisted mainly on large megavolt switches similar to the 1 MV, SF₆ filled, laser triggered gas switch installed at the University of Missouri pulsed power test stand. Factors including the applied field, rate of rise and gas pressure of the switch along with the laser power, focused intensity, and Rayleigh range have been examined to determine their relation to jitter and runtime. The end goal of research is to understand the factors contributing to increased jitter and runtime and thereby provide paths to improved switch performance.