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Low Energy Laser Triggering at 1535 nm

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The use of lasers to initiate the closure of high-power gas switches was initially explored soon after the development of suitable high power pulsed lasers in the 1960's. The low jitter, excellent triggering range, and galvanic isolation provided by laser triggering has been extensively exploited in the triggering of megavolt switches in large pulsed power machines. However, the lasers and optical systems used in these systems are very large, complex, and expensive. This has led to the perception that laser triggered gas switches are necessarily large, complex, and expensive –with the corresponding reluctance among the directed energy and compact pulsed power community to consider their use in compact pulsed power systems.

The APERIODIC research group at the University of New Mexico has been investigating novel triggering technologies for compact pulsed power. One of the technologies under investigation is a system we have named the micro integrated laser switch (MILS). This system holds the potential to overcome the limitations of traditional laser triggering of gas switches.

As part of the preliminary work on developing the MILS concept, UNM has collaborated with MegaWatt Lasers to conduct laser triggering experiments using a COTs erbium-doped glass passively Q-switched micro laser. This 28 mm by 9 mm laser produces 4 ns pulses at 1535 nm with an average energy of 250 μJ. One of the principle advantages of this laser is that, due to the wavelength and energy, it is eye-safe and can be operated without the stringent controls necessary for the lasers typically used for laser triggering.

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