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Comparing Single-Channel and Multi-Channel Ball Switches for HADES IMANI WEST-ABDALLAH, JAMES YOUNG, MATTHEW EVANS, HANNAH HASSON, MARISSA ADAMS, DANIEL MAGER, ROMAN SHAPOVALOV, PIERRE GOURDAIN, RICHARD SPIELMAN, University of Rochester — In pulsed power technology, high pressure spark gap switches are vital to creating repeatable current wave forms on the timescale of hundreds of nanoseconds. Typical spark gap switches, formed by a single current channel, have several drawbacks, such as high inductance and excessive electrode etching. Unlike single-channel spark gap switches, multi-channel ball switches allow multiple current channels to form—this reduces the inductance of the switch while increasing its lifetime. To reduce the overall inductance in and minimize maintenance on HADES; the High Amperage Driver for Extreme States, built at the University of Rochester; we designed and tested two ball switch designs: a single-channel one-ball design and a multi-channel six-ball design. Both designs use pressurized, synthetic air as its insulating medium and are tested at +/- 100kV using a single brick set-up. The switches will be able to sustain 30 kA for hundreds of nanoseconds and can be triggered using high voltage-high current systems—like HADES. Our overall goal was to minimize cost, machining time, and inductance. Both designs were compared, and the more suitable design will be considered for general LTD brick integration.

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