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Experimental Results from a Laser-Triggered, Gas-Insulated, Spark-Gap Switch. J. F. CAMACHO, Leidos, E. L. RUDEN, M. T. DOMONKOS, Air Force Research Laboratory — We are performing experiments on a laser-triggered spark-gap switch with the goal of studying the transition from photoionization to current conduction. The discharge of current through the switch is triggered by a focused 532-nm wavelength beam from a Q-switched Nd:YAG laser with a pulse duration of about 10 ns. The trigger pulse is delivered along the longitudinal axis of the switch, and the focal spot can be placed anywhere along the axis of the 5-mm, gas-insulated gap between the switch electrodes. The switch test bed is designed to support a variety of working gases (e.g., Ar, N_2) over a range of pressures. Electrical and optical diagnostics are used to measure switch performance as a function of parameters such as charge voltage, trigger pulse energy, insulating gas pressure, and gas species. A Mach-Zehnder imaging interferometer system operating at 532 nm is being used to obtain interferograms of the discharge plasma in the switch. We are also developing a 1064-nm interferometry diagnostic in an attempt to measure plasma free electron and neutral gas density profiles simultaneously within the switch gap. Results from our most recent experiments will be presented.

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