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HIGH POWER DIELECTRIC DIODE STUDIES AT SANDIA NATIONAL LABORATORY

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We recently continued the pioneering work done by Chris Rose and Kalpac Dighe at Los Alamos National Laboratory. ("Multiple-Pulse High-Voltage Diode Isolation Testing for a Linear Accelerator (LIA)"B. Trent McCuistian, Dale Dalmas, Kalpak Dighe, Chris Rose, Manolito Sanchez, Robert Sedillo, J. Martin Taccetti, in Proceeding of the 2017 Pulsed Power Conference at Brighton, England, June 2017). We did not use Blumleins (240kV) but 30 Ohm cable pulsers. Hence, our setup was limited to 100kV maximum testing across the diode cartridges. Therefore, we were forced to test only diode cartridges of ~ 40% the scale of that of LANL. Our research was mainly concentrated on the physics of semiconductor diodes and especially on measuring the reverse recovery times and currents. In addition, we explored the effect of the reverse bias pulses on a diode still under reverse recovery times. We utilized our Component Test Stand facility (CTS) ("Testing High Voltage (200kV) DC cable and feed-through designs in rep-rated modes"Michael G. Mazarakis, Mark L. Kiefer, Joshua J. Leckbee, Del. H. Anderson, Frank L. Wilkins, Robert J. Obregon, in Proceeding in Proceedings of the 2017 Pulsed Power Conference at Brighton, England, June 2017.) modified to power two diode cartridges connected in parallel to a common load (CTS-II). Although our set up could deliver two separate pulses per diode assembly, in this study, for simplicity's sake, we utilized only one pulse per diode. The cartridges were composed of 6 to 12 stages each and having three to five high power 10kV diodes.

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