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4P18 - DETERMINATION OF THE PARTICLES INVOLVED IN ANODE INITIATED VACUUM BREAKDOWN USING A 1-MV, 50-NANOSECOND PULSE GENERATOR*

Thursday 27 June 2019 16:00 (1h 30m)

Several experiments have shown that the anode initiates breakdown of vacuum gaps in cases where the anode and cathode field enhancements are approximately equal.1 The previous understanding was that only explosive emission at the cathode initiates breakdown between metal electrodes in vacuum with nanosecond pulses. Past experiments have shown clear evidence of particles from the anode initiating breakdown when the cathode was not specially roughened or treated to increase field enhancement. However, the type of particles coming from the anode was not known. Now, we have measurements from a specially designed anode-cathode structure that has allowed us to capture these particles. CR-39 film was used as a particle detector. A Thomson parabola and also a Kimfoil filter allowed us to determine the particle species.

1. R. J. Allen, et al., "Effects of Anode and Cathode Surface Treatments on Vacuum Breakdown Between Metal Electrodes with 50-ns High Voltage Pulses", 21st International Pulsed Power Conference, June 18 - 22, 2017.

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