Abstract Submitted
for the GEC19 Meeting of
The American Physical Society

Analysis of Dielectric Strength of Re-strike Phenomenon in Magnetic Driven Arc with External Magnetic Field by Numerical Simulation ZHENWEI REN, YUSUKE NEMOTO, YOSHIFUMI MAEDA, TORU IWAO, Tokyo City University — Re-strike phenomenon occurs when the arc moves between two parallel electrodes, and its frequency increases and the re-strike stride becomes short with applying external magnetic field. It is because the distance between the arc column and anode surface becomes short which leads to the occurrence of electrical breakdown become easier. According to the experiment figures, the locations of cathode spot and anode spot during arc advancement are extracted, and a 3-dimensional electromagnetic thermal fluid simulation is used to mimic the re-strike phenomenon on the basis of those data. The distance and potential difference between re-strike point and arc column right before the re-strike phenomenon occurrence are calculated. As a result, the distance between anode surface and arc column becomes shorter because of the electromagnetic force derived from external magnetic field, which also leads to the re-strike stride decrement. According to the simulation results, the dielectric strength between anode surface and arc column is calculated prior to the new anode spot appearance, and it has a minimum value when 2 mT external magnetic field density is applied. Therefore, it implies that optimal proportion of external magnetic field density and arc current does exist.

Zhenwei Ren
Tokyo City University

Date submitted: 29 May 2019 Electronic form version 1.4