Abstract Submitted
for the GEC15 Meeting of
The American Physical Society

Computational model of electrode erosion in high-pressure moving arcs[1] VLADIMIR KOLOBOV, ROBERT ARSLANBEKOV, CFDRC, VALERIAN NEMCHINSKY, Keizer University, ALEXANDER RABINOVICH, ALEXANDER FRIDMAN, Drexel University — We will present an overview of our efforts to develop computational model of electrode erosion for ultra-high pressure (10-100 atm), high current density ($\sim 10^9 \mathrm{A/m^2}$) magnetically rotated arcs, which are used for gas heating at hypersonic testing facilities. The arc roots move along internal surfaces of copper electrodes in the form of hollow cylinders. The electrode erosion process at high pressures has many common features with the cold electrode erosion of the vacuum arcs with account for the gas-dynamic effects on the electrode-vapor plasma jets generated due to Maecker effect. We will show results of simulations of the arc column rotation induced by the Lorentz force and by the swirling gas flows using adaptive mesh refinement (AMR) technique. Photographs of the arc root traces indicate micro-crater formation of the cathode surface at atmospheric pressure. We will discuss the applicability of the explosive electron emission model and the *ecton (explosion center)* theory to describe electrode erosion of high-pressure arcs.

[1]Supported by AFOSR STTR Phase II project monitored by Dr. M.Kendra

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Date submitted: 19 Jun 2015 Electronic form version 1.4