Abstract Submitted
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Sensitivity analysis via kinetic global modeling of rotating spokes in HiPIMS[1] SARA GALLIAN, JAN TRIESCHMANN, THOMAS MUSSENBROCK, Ruhr University Bochum, WILLIAM N.G. HITCHON, University of Wisconsin-Madison, RALF PETER BRINKMANN, Ruhr University Bochum — High Power Impulse Magnetron Sputtering discharges are characterized by high density plasma (peak electron density 10^{18} - 10^{20} m^{-3}) in a strong magnetic field (100 mT), with highly energetic secondary electrons (500 - 1000 eV). The combination of these factors results in a discharge showing a vast range of instabilities, in particular, a single rotating high emissivity region is often observed. This highly ionized region -or spoke- shows a stationary behavior in the current plateau region and rotates with $\Omega \approx$ kHz.[2] We apply a global model that evolves the electron energy distribution function self-consistently with the rate equations for Ar and Al species. The volume average is performed *only* in the structure region and a net neutral flux term is imposed to model the spoke rotation. Outside the spoke region, the neutral densities are evolved according to a phenomenological fluid model.[3] The model is solved using a relaxation method. We present a sensitivity analysis of the resulting steady state on the different physical mechanisms and comment on the anomalous electron transport observed.

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[2]A. Hecimovic et al. (2013), submitted
[3]S. Gallian et al. (2013), submitted

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