Abstract Submitted
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Analysis of Electron Trajectories in Magnetized High Power Plasmas[1] DENNIS KRUEGER, SARA GALLIAN, JAN TRIESCHMANN, RALF PETER BRINKMANN, Institute of Theoretical Electrical Engineering, Ruhr University Bochum, Germany — High Power Impulse Magnetron Sputtering (HiPIMS) is an important example of magnetized technological plasmas. With HiPIMS the focus lies on the generation of a high density plasma with a remarkably high degree of ionization [1]. It can be used for the deposition of thin films with superior density and quality. Theoretical approaches to the regime of magnetized low temperature plasmas encounter some fundamental difficulties, for example concerning the details of the magnetic field configuration, the strongly varying degree of magnetization, and the frequent wall interactions. A kinetic single particle model is used for the investigations. Single electron trajectories are analyzed with the widely used Boris algorithm [2] within the magnetized zone above the target (racetrack). We further examine a configuration where symmetry breaking occurs due to a potential bump, which is rotating azimuthally around the racetrack (spoke). Observing the effects of this structure on the single electron motion may allow us to obtain further insight into this phenomenon.

[1] J. T. Gudmundsson et al., J. Vac. Sci. Technol. A **30**, 030801 (2012)
[2] J. P. Boris, Proc. 4th Conf. Num. Sim. Plasmas, 3–67 (1970)

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