

Abstract Submitted
for the GEC14 Meeting of
The American Physical Society

Efficient Modelling of Pulsing CCP Reactors¹ SCHABNAM NAGGARY, FRANK ATTELN, RALF PETER BRINKMANN, Ruhr-University Bochum, Institute for Theoretical Electrical Engineering, MUSTAFA MEGAHED, ESI Group — Pulsed multi-frequency CCP reactors provide additional means to manipulate the plasma characteristics and in particular the ion energy distribution. The interaction of the plasma with the pulse duty cycle and frequency is not fully understood yet, due to complex excitation and de-excitation of the rf and pulsing signals. Numerical models were demonstrated to accurately capture the transient behavior of the pulsed plasma. The high computational effort, however, makes these models very inaccessible to the community and do not allow for systematic study of the different parameters of interest to system designers. This work presents an efficient model that allows the characterization of the “main” plasma properties including the ion energy distribution functions within seconds. The zero dimensional model allows the analysis of the reactor operation parameter space and it provides the boundary conditions for more detailed, spatially resolved models that are used to fine tune the design including the resolution of wafer edge and wave effects.

¹The authors gratefully acknowledge the financial support by the SFB- TR 87 and the ESI Group

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Date submitted: 16 Jun 2014

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