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Evaluation of Equivalent Circuit Models for Plasma Bulk Characterization by Comparing IEDF Predictions with those of a Spatially Resolved CCP Model[1] SCHABNAM NAGGARY, MOHAMMED SHIHAB, FRANK ATTELN, Ruhr University Bochum, MUSTAFA MEGAHED, ESI Group, RALF PETER BRINKMANN, Ruhr University Bochum — Capacitively coupled radio frequency discharges are widely used in the semiconductor processing industry for thin film deposition and etching. Thus the evaluation of the ion energy distribution function (IEDF) is of paramount importance for industrial applications. Spatially and temporally resolved CCP models are generally computationally expensive leading to reduced applicability of these models for industrial optimization. In order to reduce the simulation time, as an alternative method, we use equivalent circuits based on a global model to characterize the plasma bulk and provide the needed input parameters for a hybrid sheath model [1, 2, 3]. The overall computational time to obtain time averaged IEDFs lies within seconds, hence the concept is very attractive for industrial scanning and optimization. In order to assess the applicability of this novel approach the results are compared with those of commercial multi-physics software CFD-ACE+ in 2 and 3 dimensions. Our investigation demonstrates the feasibility of the compromise between short simulation times and accurate calculation of spatially resolved IEDF.

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