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Modeling of dual frequency capacitive discharges with pulse-modulated power input SCHABNAM NAGGARY, EFE KEMANECI, RALF PETER BRINKMANN, Ruhr-University Bochum, MOHAMMED SHIHAB, Tanta University Egypt and Univerity of Rostock, ZOLTÁN KOVÁCS, MUSTAFA MEGAHED, ESI Group — Pulse-modulated capacitive discharges provide additional degrees of freedom to modify the characteristic features of plasma constituents and control the ion energy distribution function (IEDF). In addition, dual frequency capacitive discharges enable a functional separation of the sheath voltages and the plasma composition, allowing for a more precise control of the ion energy distribution [1]. In this contribution, a dual frequency pulse-modulated capacitive discharge is numerically studied. In the first part of the investigation, a global model is used to provide a quick assessment of the discharge characteristics. The model consists of two parts, a multimode lumped circuit model and a chemical global model. With an iterative coupling of the two models, the plasma parameters are obtained self-consistently. An analytic sheath model then delivers the IEDF [2,3]. Multiple scenarios are parametrically investigated. Furthermore, a spatially resolved analysis is conducted using the multiphysics tool CFD-ACE+. This is compared with the global modeling approach particularly concerning the key factors accuracy and computational cost.

[1] D Wen et al., J. Appl. Phys. 115 (2014)
[2] M Kratzer et al., J. Appl. Phys. 90 (2001)
[3] M Shihab et al., J. Phys. D: Appl. Phys. 45 (2012)

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