P 8 Hauptvortrag 3: Niedertemperaturplasmen

Zeit: Dienstag 10:30–11:10 Raum: 1002

Hauptvortrag P 8.1 Di 10:30 1002

Numerical characterization of dual frequency capacitively coupled hydrogen plasmas — •Aurel Salabas — Theoretical Electrical Engineering, Ruhr-University Bochum,Universitätsstr. 150, D-44801 Bochum, Germany

In this work we report on results from a numerical investigation of dual frequency capacitively coupled plasmas. The calculations simulate H_2 discharges produced by a combination of two rf sources with the frequency in the domain $2-60$ MHz, at pressures $p = 150-500$ mTorr and for $V_{rf} = 25-1000$ V applied voltages. A recently developed two-dimensional fluid model is used to provide information about the space-time evolution of the main physical quantities: electron density, electron mean energy, plasma potential,ionization rate; other parameters such as the self-bias voltages and the coupled electrical power are also calculated. For single frequency discharges, the model has been tested against measurements; and a good agreement has been found.

Here we provide a comparative analysis between single and dual frequency discharges. For dual frequency discharges, the influence of geometry, frequency, pressure, and applied voltages on the plasma parameters is discussed. The results reproduce well the behavior of the physical quantities (e.g. the modulation of the plasma potential) and are in agreement with other analytical and numerical studies. The model predictions indicate also that the combination of the two frequencies leads to a space-time modulated structure of the ionization maxima, with considerable ionization processes occurring within the bulk region.