

Abstract Submitted
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Resonance Phenomena of Voltage and Current Driven Capacitively Coupled Plasmas SEBASTIAN WILCZEK, JAN TRIESCHMANN, Ruhr-University Bochum, Germany, JULIAN SCHULZE, EDMUND SCHUENGEL, West Virginia University, Morgantown, USA, RALF PETER BRINKMANN, Ruhr-University Bochum, Germany, ARANKA DERZSI, IHOR KOROLOV, ZOLTÁN DONKÓ, Wigner Research Centre for Physics, Budapest, Hungary, THOMAS MUSSENBROCK, Ruhr-University Bochum, Germany — The plasma series resonance is a fundamental phenomenon due to the nonlinear interaction between the plasma bulk and the sheaths of a capacitive discharge. It has been proven to play an important role in the context of electron heating. Furthermore, recent results indicate that the manifestation of harmonics in the plasma current due to the plasma series resonance is responsible for a nonlinear standing wave effect and, consequently, spatial inhomogeneities in the power deposition. It is important to note that the plasma series resonance is a current governed resonance and that it can only be excited in voltage driven systems. Particle-In-Cell simulations however show that also in current driven systems resonances can occur due to the non-linear excitation of harmonics in the conduction and displacement current. In this work, the differences between voltage and current driven capacitive discharges in terms of their nonlinear behavior are investigated. It is found that under certain conditions nonlinear plasma parallel resonances are excited which are able to support the electron heating.

Sebastian Wilczek
Ruhr-University Bochum

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