Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Collisionless spectral-kinetic Simulation of the Multipole Resonance Probe WLADISLAW DOBRYGIN, DANIEL SZEREMLEY, CHRISTIAN SCHILLING, JENS OBERRATH, DENIS EREMIN, THOMAS MUSSENBROCK, RALF PETER BRINKMANN, Institute for Theoretical Electrical Engineering, Ruhr University Bochum, 44780 Bochum, Germany — Plasma resonance spectroscopy is a well established plasma diagnostic method realized in several designs. One of these designs is the multipole resonance probe (MRP). In its idealized - geometrically simplified - version it consists of two dielectrically shielded, hemispherical electrodes to which an RF signal is applied. A numerical tool is under development, which is capable of simulating the dynamics of the plasma surrounding the MRP in electrostatic approximation. In the simulation the potential is separeted in an inner and a vacuum potential. The inner potential is influenced by the charged partilces and is calculated by a specialized Poisson solver. The vacuum potential fulfills Laplace's equetion and consists of the applied voltage of the probe as boundary condition. Both potentials are expanded in spherical harmonics. For a practical particle pusher implementation, the expansion must be appropriately truncated. Compared to a PIC simulation a grid is unnecessary to calculate the force on the particles. This work purpose is a collisionless kinetic simulation, which can be used to investigate kinetic effects on the resonance behavior of the MRP.

[1] M. Lapke et al., Appl. Phys. Lett. 93, 2008, 051502.

Wladislaw Dobrygin
Institute of Theoretical Electrical Engineering,
Ruhr University Bochum, 44780 Bochum, Germany

Date submitted: 18 Jun 2012 Electronic form version 1.4