Abstract Submitted
for the DAMOP12 Meeting of
The American Physical Society

Kinetic phenomena in electron transport in non-equilibrium plasmas sustained by radiofrequency electric and magnetic fields SASA DUJKO, Institute of Physics, University of Belgrade, PO Box 68, Zemun 11080, Belgrade, Serbia, RON WHITE, ARC Centre for Antimatter-Matter Studies, School of Engineering and Physical Sciences, James Cook University, Townsville 4810, Australia, ZORAN PETROVIC, Institute of Physics, University of Belgrade, PO Box 68, Zemun 11080, Belgrade, Serbia — Future generation plasma discharge technologies require an accurate knowledge of the transport properties of charged particles in gases under the influence of electric and magnetic fields. In this work, the non-equilibrium transport of electrons in gases under the influence of radio-frequency electric (**E**) and magnetic (**B**) fields is studied via a unified time-dependent multi term solution of Boltzmann's equation. We systematically investigate the explicit effects associated with the **E** and **B** fields including field to density ratios, field frequency to density ratio, field phases and field orientations. In particular, we highlight the duality of transport coefficients induced by the explicit and implicit effects of non-conservative collisional processes of attachment and ionization. A multitude of kinetic phenomena are observed that are generally unpredictable through the use of steady-state dc transport theory. Phenomena of significant note include the existence of transient negative diffusivity, time-resolved negative differential conductivity and anomalous anisotropic behavior of longitudinal and transverse diffusion coefficient along the **E**×**B** direction.

Sasa Dujko
Institute of Physics, University of Belgrade,
PO Box 68, Zemun 11080, Belgrade, Serbia

Date submitted: 26 Jan 2012 Electronic form version 1.4