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Temporal relaxation of the electron transport properties in magnetized plasma discharges SASA DUJKO, Institute of Physics Belgrade, RONALD WHITE, 2ARC Centre for Antimatter-Matter Studies, School of Engineering and Physical Sciences, James Cook University, Townsville 4810, Australia, ZORAN PETROVIC, Institute of Physics Belgrade — The progress and further improvements of modern technology associated with the non-equilibrium magnetized plasma discharges require the most accurate modeling of charged particle transport under the influence of electric (E) and magnetic (B) fields in neutral gases. In this work, the temporal relaxation of electrons in gases under the influence of dc E and B fields crossed at arbitrary angle is studied via a multi term solution of the Boltzmann equation and Monte Carlo simulation technique. We systematically investigate the explicit effects associated with the E and B fields and field orientations. In particular, we highlight the explicit modification of transport coefficients about by non-conservative collisional processes of attachment and ionization. Among many interesting kinetic phenomena observed for the first time in this work, we note the existence of the transiently negative diffusivity. We systematically study the origin and mechanisms for such phenomena, their sometimes paradoxical manifestation and possible physical implications which arise from their explicit inclusion into plasma models.

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