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Positron transport in gases in electric and magnetic fields crossed at arbitrary angles ANA BANKOVIC, SASA DUJKO, SRDJAN MARJANOVIC, Institute of Physics, Pregrevica 118, 11080 Belgrade, Serbia, RONALD D. WHITE, ARC Centre for antimatter-Matter Studies, School of Engineering and Physical Sciences, James Cook University, Townsville 4810, Australia, ZORAN LJ. PETROVIC, Institute of Physics, Pregrevica 118, 11080 Belgrade, Serbia — The knowledge of positron transport in gases under the influence of electric and magnetic fields is of key importance in optimizing positron traps. In this work we apply a multi term solution of Boltzmann's equation to study positron transport in gases under the influence of electric and magnetic fields crossed at arbitrary angles. Calculations are performed over a range of E/N and B/N values, and angles between the fields for positrons in N2, H2 and H2O. Values of mean energy, drift velocity, diffusion tensor, energy gradient vector, and temperature tensor and rate coefficient for positronium (Ps) formation are reported in this work. It is demonstrated that the difference between the bulk and flux transport coefficients resulting from the explicit effects of Ps formation can be controlled either by the variation in the magnetic field strengths or by the angles between the fields. Special attention is paid to synergistic effects of Ps formation and angle between the fields on the Ps-induced NDC phenomenon for positrons in H2 and H2O. The results presented in this work represent the first multi term solution of the non-conservative Boltzmann equation for positrons in varying configurations of electric and magnetic fields.

Srdjan Marjanovic
Institute of Physics, Pregrevica 118, 11080 Belgrade, Serbia

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