

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Current Bearing Electron Shock Wave¹ MOSTAFA HEMMATI,
Arkansas Tech University — For analytical solution of breakdown waves, we use a one-dimensional, steady-state, three-component (electrons, ions, and neutral particles) fluid model. The wave front is considered to be a shock front and the electron gas partial pressure is considered to provide the driving force for the propagation of the wave. The basic set of equations consists of the equation of conservation of mass flux, equation of conservation of momentum, equation of conservation of energy, plus Poisson's equation. In this study, the emphasis will be on the waves propagating into a neutral medium and we will investigate breakdown waves for which a large current exist behind the wave front. We apply shock conditions to obtain breakdown wave profile for electric field, electron velocity, electron temperature, electron number density, and ionization rate behind the shock front for breakdown waves propagating in the opposite direction of the electric field force on electrons.

¹We would like to express our gratitude for Arkansas Space Grant Consortium's financial support of this project.

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Date submitted: 20 Oct 2010

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