Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

**Breakdown Waves Propagating into a Neutral Medium** MOSTAFA HEMMATI, Arkansas Tech University — The propagation of breakdown waves in a gas has been investigated by applying a set of one-dimensional, steady state, three component fluid equations. The results of electron-fluid theory of breakdown waves as developed so far has been in good agreement with experimental results at velocities above and below the ionization velocity for the gas. Our set of equations consists of equations of conservation of mass, momentum, and energy, coupled with the Poisson's equation. Breakdown waves are composed of a thin dynamical region (the shock layer) followed by a thicker thermal region. In the shock layer, which often is referred to as the sheath region, the electric field reduces to zero and the electrons come to rest relative to ions and neutral particles at the trailing edge of the sheath. For breakdown waves propagating into a non-ionized medium, the set of electron-fluid dynamical equations has successfully been integrated through the shock layer. Our solutions fulfill the expected physical conditions at the trailing edge of the shock layer. For breakdown waves moving into a non-ionized medium, we will present the method of integration of the electron-fluid dynamical equations through the shock layer. Also, for two wave speeds, we will present the wave profile for electric field, electron velocity, ionization rate, electron number density, and electron temperature inside the shock layer.

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Date submitted: 13 Dec 2006 Electronic form version 1.4