# DEVELOPMENT OF SPIN CONNECTION RESONANCE IN THE COULOMB LAW.

by

M. W. Evans

Civil List Scientist

and

H. Eckardt,

A.I.AS. Deputy Director and Fellow

(emyrone@aol.com, horsteck@aol.com)

ABSTRACT

It is shown that the Coulomb law if developed in the context of a generally covariant unified field theory produces several classes of resonant phenomena due to the fact that the electromagnetic field is the Cartan torsion of Einstein Cartan Evans (ECE) field theory. The electromagnetic potential is always defined with the spin connection, so the possibility of resonance is always present, in the sense that the potential of the Coulomb law can be amplified by damped or undamped resonance. In suitable materials this resonance produces free electrons which may be used for power generation as first demonstrated by Tesla.

Keywords: ECE theory, spin connection resonance in the Coulomb law, new sources of electric power.

92nd. Paper of ECE Theory

## 1. INTRODUCTION

Recently a generally covariant unified field theory has been developed based on standard Cartan geometry {1-8} - Einstein Cartan Evans (ECE) field theory. One of the many consequences of the ECE theory is that the fundamental laws of classical electrodynamics are augmented. The ECE theory reduces to these well known laws in well defined limits, but also gives more information based on the fact that the electromagnetic field tensor is the Cartan torsion within a proportionality $cA^{(0)}$ in volts. The electromagnetic potential is always defined as the Cartan tetrad, so that the electromagnetic field always contains the spin connection. In the absence of the spin connection the ECE theory reduces straightforwardly to the standard Maxwell Heaviside (MH) theory {9}, because without a spin connection , space-time reduces to the flat Minkowski space-time of MH theory.

In Section 2 the most general ECE equation of the Coulomb law is developed to show that there exists a class of resonant solutions which can be demonstrated straightforwardly. The Coulomb limit is defined and conditions for damped and undamped resonance discussed . In Section 3, another novel class of resonant solutions is obtained by considering a heterodyne type driving force with a simple spin connection. There is freedom of choice of spin connection as long as the reduction to the Coulomb law is well defined. In the vast majority of cases the Coulomb law is observed to be very accurate, but Tesla {10} was the first to demonstrate experimentally that resonant power can be obtained form space-time. Therefore behind the Coulomb law is hidden a new world of possibilities for obtaining resonant electric power from space-time.

## 2. SIMPLE RESONANT SOLUTIONS

The basic spin connection resonance (SCR) equation of the Coulomb law {1-8} is written in terms of the radial coordinate as:

$$\frac{\partial^2 \phi}{\partial r^2} + \left(\frac{2}{r} + \omega_r\right)\frac{\partial \phi}{\partial r} + \frac{\phi}{r^2}\left(2 r \omega_r + r^2 \frac{\partial \omega_r}{\partial r}\right) = -\frac{\rho}{\epsilon_0} \quad -(1)$$

where $\phi$ is the potential of the Coulomb law, r is the radial coordinate, $\omega_r$ the spin connection, $\rho$ the charge density and $\epsilon_0$ the vacuum permittivity in S.I. units. Eq. ( 1 ) can be reduced straightforwardly to the basic structure of the damped resonator equation , which was discovered in the eighteenth century { 11 }:

$$\frac{d^2 x}{dr^2} + 2\beta \frac{dx}{dr} + \kappa_0^2 x = A \cos(\kappa r). \quad -(2)$$

In Eq. ( 2 ) $\beta$ takes the role of the friction coefficient, and $\kappa_0$ is a Hooke's law type wave-number. The right hand side term in Eq. ( 2 ) is a cosinal driving term with a characteristic wave-number $\kappa$ , and A is a proportionality constant.

Eq .( 1 ) reduces to Eq. ( 2 ) when:

$$\omega_r = 2\left(\beta - \frac{1}{r}\right), \quad -(3)$$

$$\kappa_0^2 = \frac{4}{r}\left(\beta - \frac{1}{r}\right) + \frac{\partial \omega_r}{\partial r}. \quad -(4)$$

Solving these equations defines the condition under which the spin connection gives the simple resonance equation ( 2 ):

$$\omega_r = \kappa_0^2 - 4\beta \log_e r - \frac{4}{r}. \quad -(5)$$

Under this condition, Eq. ( 1 ) becomes:

$$\frac{\partial^2 \phi}{\partial r^2} + 2\beta \frac{\partial \phi}{\partial r} + \kappa_0^2 \phi = -\frac{\rho}{\epsilon_0}, \quad -(6)$$

an equation which gives well known resonant solutions and their equivalent circuits, so that the circuits used for example by Tesla can be designed and etched on to foundry material.

Reduction to the Coulomb law occurs when

$$\beta = \frac{1}{r}. \quad -(7)$$

It is seen from Eqns. ( 3 ) and ( 4 ) that under the condition ( 7 ):

$$\omega_r = 0, \quad \kappa_0^2 = 0, \quad -(8)$$

so that the Coulomb law is obtained:

$$\frac{\partial^2 \phi}{\partial r^2} + \frac{2}{r}\frac{\partial \phi}{\partial r} = -\frac{\rho}{\epsilon_0}. \quad -(9)$$

In general however there is no reason to assume that condition ( 7 ) must always hold. The Coulomb law holds experimentally in the vast majority of applications, but in general relativity it is greatly enriched by the spin connection. The traditional structure ( 9 ) is regained if and only if the friction coefficient is defined by Eq. ( 7 ).

Reduction to the undamped resonator occurs when:

$$\beta = 0 \quad -(10)$$

which implies:

$$\omega_r = -\frac{2}{r}, \quad \frac{\partial \omega_r}{\partial r} = \frac{2}{r^2}, \quad \kappa_0^2 = -\frac{2}{r}. \quad -(11)$$

If there is dispersion { 9 } in the wave-number $\kappa_0$ it becomes complex valued:

$$\kappa_0 = \kappa_0' + i\kappa_0''. \quad -(12)$$

The conjugate product is:

$$\kappa_0 \kappa_0^* = \kappa_0'^2 + \kappa_0''^2 \quad -(12)$$

and is positive valued, but the square is :

$$\kappa_0^2 = \kappa_0'^2 - \kappa_0''^2 + 2i\kappa_0'\kappa_0''. \quad -(13)$$

Therefore an undamped resonator equation of the type:

$$\frac{\partial^2 \phi}{\partial r^2} + \kappa_0 \kappa_0^* \phi = -\frac{\rho}{\epsilon_0} \quad -(14)$$

can exist. At resonance it is well known that the solutions of the undamped resonator become infinite. Signifying the release of free electrons into a power circuit from well chosen materials {1-8}.