(2): Vector Boson Structure of the Electric Field:
Some Details

$$\underline{E}^a = -\underline{\nabla}\phi^a + \underline{\omega}^a{}_b\phi^b \quad -(1)$$

$$a, b = 0, \dots, 3$$

Assume for simplicity only that:

$$\phi = \phi^0 = \phi^1 = \phi^2 = \phi^3 \quad -(2)$$

then:

$$\underline{E}^a = -\underline{\nabla}\phi^a + \left(\underline{\omega}^a{}_0 + \underline{\omega}^a{}_1 + \underline{\omega}^a{}_2 + \underline{\omega}^a{}_3\right)\phi \quad -(3)$$

i.e.

$$E^a_1 = -\frac{\partial}{\partial x_1}\phi^a + \left(\omega^a{}_{10} + \omega^a{}_{11} + \omega^a{}_{12} + \omega^a{}_{13}\right)\phi$$

$$E^a_2 = -\frac{\partial}{\partial x_2}\phi^a + \left(\omega^a{}_{20} + \omega^a{}_{21} + \omega^a{}_{22} + \omega^a{}_{23}\right)\phi$$

$$E^a_3 = -\frac{\partial}{\partial x_3}\phi^a + \left(\omega^a{}_{30} + \omega^a{}_{31} + \omega^a{}_{32} + \omega^a{}_{33}\right)\phi \quad -(4)$$

The elements are defined by:

$$\omega^1_{\mu 2} = \omega^1_{\mu 3} = \omega^2_{\mu 3} = \frac{\kappa}{2} V^0_\mu, \quad -(5)$$

$$\omega^2_{\mu 1} = -\omega^1_{\mu 2} \quad \text{etc.}$$

For $a = 1$

$$E^1_1 = -\frac{\partial}{\partial x_1}\phi + \left(\omega^1{}_{10} + \omega^1{}_{11} + \omega^1{}_{12} + \omega^1{}_{13}\right)\phi$$

II)

$$= -\frac{\partial}{\partial x_2}\phi + \left(\omega^1{}_{12} + \omega^1{}_{13}\right)\phi$$

$$= -\frac{\partial}{\partial x_1}\phi + \kappa\phi$$

$+1$ $$\boxed{\underline{E}^1 = -\underline{\nabla}\phi + \underline{\kappa}\phi} \quad \text{— (6)}$$

$\underline{a=2}$

$$E^2{}_1 = -\frac{\partial}{\partial x_2}\phi + \left(\omega^2{}_{10} + \omega^2{}_{11} + \omega^2{}_{12} + \omega^2{}_{13}\right)\phi$$

$$= -\frac{\partial}{\partial x_2}\phi + \left(\omega^2{}_{11} + \omega^2{}_{13}\right)\phi$$

$$= -\frac{\partial}{\partial x_2}\phi + \left(\omega^2{}_{13} - \omega^1{}_{12}\right)$$

$$= -\frac{\partial}{\partial x_2}\phi$$

0 $$\boxed{\underline{E}^2 = -\underline{\nabla}\phi} \quad \text{— (7)}$$

$\underline{a=3}$

$$E^3{}_1 = -\frac{\partial\phi}{\partial x_3} + \left(\omega^3{}_{10} + \omega^3{}_{11} + \omega^3{}_{12} + \omega^3{}_{13}\right)\phi$$

$$= -\frac{\partial}{\partial x_3}\phi + \left(\omega^3{}_{11} + \omega^3{}_{12}\right)\phi$$

$$= -\frac{\partial}{\partial x_3}\phi - \left(\omega^1{}_{13} + \omega^2{}_{13}\right)\phi$$

$$= -\frac{\partial}{\partial x_3}\phi - \kappa\phi$$

$$\boxed{\underline{E}^3 = -\underline{\nabla}\phi - \underline{\kappa}\phi} \quad -(8)$$

The Jones indices are $(\underline{1}, 0, -\underline{1})$. The electric field develops an internal space, which originates in the structure of ECE spacetime. The spin connection reduces to $(\underline{\kappa}, \underline{0}, -\underline{\kappa})$. For the first and third of these resonance occurs, but not for the second, in which the spin connection vanishes. So the spin connection is also a vector Jones.

This is a rigorously objective development of the static electric field using ~~the~~ principles of general relativity in ECE ~~theory~~. In fact, general relativity is much more practically important to physics when applied to electrostatics ~~than~~ when applied to gravitation. This is because of the obvious practical importance of electricity.