356(8): Some Spacetime or Aether Properties Induced by an Electromagnetic Potential

From Note 356(7) the fundamental equation is:

$$\underline{v}_F = \left(\frac{\rho}{\rho_m}\right)(\text{material})\,\underline{W}\,(\text{material}) \quad -(1)$$

where $\underline{v}_F$ is the velocity field of spacetime regarded as a fluid. The ratio (ρ/ρ_m)(material) is the ratio of charge to mass density of the material, and $\underline{W}$ is the ECE2 vector potential of the material. Therefore $\underline{v}_F$ is induced in spacetime by the $\underline{W}$ of the material.

From $\underline{v}_F$, several induced properties of spacetime or aether fluid dynamics can be calculated.

1) The Aether Acceleration

$$\underline{a}_F = \frac{\partial \underline{v}_F}{\partial t} + (\underline{v}_F \cdot \underline{\nabla})\underline{v}_F \quad -(2)$$

where:

$$(\underline{v}_F \cdot \underline{\nabla})\underline{v}_F = \frac{1}{2}\underline{\nabla} v_F^2 - \underline{v}_F \times (\underline{\nabla} \times \underline{v}_F) \quad -(3)$$

2) The Kambe Charge of the Aether

This is:

$$q_F = \underline{\nabla} \cdot \left((\underline{v}_F \cdot \underline{\nabla})\underline{v}_F\right) \quad -(4)$$

where the term in brackets is given from eq. (3).

3) The Kambe Current of the Aether

$$\underline{J}_F = a_0^2\,\underline{\nabla} \times (\underline{\nabla} \times \underline{v}_F) - \frac{\partial}{\partial t}\left((\underline{v}_F \cdot \underline{\nabla})\underline{v}_F\right) \quad -(5)$$

2) where a_0 is the assumed constant speed of sound.

4) The Derivative of the Aether Scalar Potential $\underline{\Phi}_F$

This is calculated from the Lorenz condition:

$$\frac{\partial \Phi_F}{\partial t} + a_0^2 \, \underline{\nabla} \cdot \underline{v}_F = 0 \quad -(6)$$

5) The Kambe Magnetic field or Vorticity $\underline{w}_F$

This is calculated from:

$$\underline{B}_F = \underline{w}_F = \underline{\nabla} \times \underline{v}_F \quad -(7)$$

This is the vorticity induced in the aether by the material's vector potential $\underline{W}$ (material).

6) The Kambe Electric Field

This is:

$$\begin{aligned}\underline{E}_F &= (\underline{v}_F \cdot \underline{\nabla}) \underline{v}_F \quad -(8) \\ &= \frac{1}{2} \underline{\nabla} v_F^2 - \underline{v}_F \times (\underline{\nabla} \times \underline{v}_F) \\ &= - \underline{\nabla} \underline{\Phi}_F - \frac{\partial \underline{v}_F}{\partial t}\end{aligned}$$

so $\underline{\nabla} \underline{\Phi}_F$ can be calculated. As in UFT355 this is defined by:

$$\underline{\Phi}_F = h + \phi - (\mu + \mu') \underline{\nabla} \cdot \underline{v}_F - \phi_1 \quad -(9)$$

where

$$\underline{\nabla} \phi_1 = \mu \nabla^2 \underline{v}_F \quad -(10)$$

3) 7) Wave Properties

These are defined by:

$$\Box \underline{\Phi}_F = q_F \quad -(11)$$

and

$$\Box \underline{V}_F = \frac{1}{a_0^2} \underline{J}_F \quad -(12)$$

where

$$\Box = \frac{1}{a_0^2} \frac{\partial^2}{\partial t^2} - \nabla^2 \quad -(13)$$

8) Induced Enthalpy Gradient

$$\underline{\nabla} h_F = \frac{1}{\rho_F} \underline{\nabla} \underline{P}_F = -\frac{\partial \underline{V}_F}{\partial t} - (\underline{V}_F \cdot \underline{\nabla}) \underline{V}_F \quad -(14)$$

9) Induced Baroclinic Torque $\underline{\nabla} \rho_F \times \underline{\nabla} \underline{P}_F$

This is defined by the vorticity equation of the aether:

$$\frac{\partial \underline{W}_F}{\partial t} + \underline{\nabla} \times (\underline{W}_F \times \underline{V}_F) = \frac{1}{\rho_F^2} \underline{\nabla} \rho_F \times \underline{\nabla} \underline{P}_F + \frac{1}{R_F} \nabla^2 \underline{W}_F \quad -(15)$$

where R_F is the Reynolds number of the aether

10) Induced Reynolds Number

If it is assumed that the baroclinic torque is zero, the induced Reynolds number

4) is defined by:

$$\frac{\partial \underline{W}_F}{\partial t} + \underline{\nabla} \times (\underline{W}_F \times \underline{V}_F) = \frac{1}{R_F} \nabla^2 \underline{W}_F \quad -(16)$$

The Reynolds number is induced in the aether by the material vector potential $\underline{W}$ (material)

All these quantities can be computed for any vector potential of any material. The aether then has an effect on materials, notably electric and magnetic fields induced by spacetime.