General Fluid Field Theory

With A Solution To The Dark Forces

Robert James Mapes

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Abstract

Unifying equations from magento-hydrodynamics to model a general fluid and proposing the existence of the *ether* using these equations then to analyse the effect's from the *ether* to postulate the cause of the dark forces.

> ***"That one body may act upon another at a distance through a vacuum without the mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity that I believe no man who has in philosophical matters a competent faculty of thinking can ever fall into it."*** *— Isaac Newton, Letter to Bentley (1692)*

The equations for a general fluid field with no external forces acting upon it with a velocity $\mathbf{V}$, vorticity $\mathbf{W}$ where $\mathbf{W} = \nabla \times \mathbf{V}$ and spin $\mathbf{S} = \mathbf{V} \times \mathbf{W}$ are:

$$\nabla \cdot \mathbf{V} = Q(\mathbf{x}) \tag{1}$$

$$\nabla \cdot \mathbf{W} = 0 \tag{2}$$

$$\frac{\partial \mathbf{V}}{\partial t} = -\nabla \mathbf{\Phi} + \mathbf{S} + \nu \nabla^2 \mathbf{V} \tag{3}$$

$$\frac{\partial \mathbf{W}}{\partial t} = \nabla \times \mathbf{S} + \nu \nabla^2 \mathbf{W} \tag{4}$$

- The pressure gradient and kinetic energy of the fluid is $-\nabla \mathbf{\Phi}$.
- The source or sink of the velocity is $Q(\mathbf{x})$.
- The viscosity of the fluid is ν.

Deriving Maxwell's Equations.

To derive Maxwell's equations from the listed equations, we begin with the definitions, the electric field $\mathbf{E}$, magnetic field $\mathbf{B}$ and the current $\mathbf{J}$ is defined as as:

$$\mathbf{E} = -\frac{\partial \mathbf{V}}{\partial t} - \nabla\Phi, \quad \mathbf{B} = \nabla \times \mathbf{V}, \quad \mathbf{J} = -\frac{1}{\mu_0}\nabla^2\mathbf{V} - \epsilon_0\frac{\delta \mathbf{E}}{\delta t}$$

To get Faraday's Law, take the curl of $\mathbf{E}$ and since $\nabla \times (\nabla\Phi) = 0$, this simplifies to:

$$\nabla \times \mathbf{E} = \nabla \times \left(-\frac{\partial \mathbf{V}}{\partial t} - \nabla\Phi\right) = -\frac{\partial \mathbf{B}}{\partial t}$$

To get Gauss's Law's, take the divergence of $\mathbf{B}$:

$$\nabla \cdot \mathbf{B} = \nabla \cdot (\nabla \times \mathbf{V}) = 0$$

Then suppose charge density ρ acts as a source of Φ. Then assuming $\nabla \cdot \mathbf{V} = 0$, this reduces to:

$$\nabla \cdot \mathbf{E} = -\nabla \cdot \left(\frac{\partial \mathbf{V}}{\partial t} + \nabla\Phi\right) = -\nabla^2\Phi = \frac{\rho}{\varepsilon_0}$$

Finally to get Ampère-Maxwell Law, let current density $\mathbf{J}$ be related to sources of $\mathbf{V}$, then using the identity $\nabla \times (\nabla \times \mathbf{V}) = \nabla(\nabla \cdot \mathbf{V}) - \nabla^2\mathbf{V}$ and if $\nabla \cdot \mathbf{V} = 0$:

$$\nabla \times \mathbf{B} = \nabla \times (\nabla \times \mathbf{V}) = \mu_0\mathbf{J} + \mu_0\varepsilon_0\frac{\partial \mathbf{E}}{\partial t}$$

Here we then conclude that Maxwell's equations can be derived from the equations for general fluid field theory. In this framework the current density $\mathbf{J}$ is the source of $\mathbf{V}$ hence, supposing the existence of the electromagnetic fluid then the result of EM waves is due to a material causing the source currents of the fluid.

Kinematics Without Gravity

Now let us derive an equation of motion for an object in a fluid, let's suppose no motion from the fluid's spin or velocity and account only for the pressure gradient, and that the law of *gravity* is not assumed. The acceleration of a parcel of the fluid is,

$$\alpha = -\frac{1}{\rho_{fluid}}\nabla P, \quad where \quad g = -\frac{1}{\rho_{air}}\nabla P_{air}$$

Suppose an object is placed inside the fluid, it will experience the pressure gradient caused by the fluid,

$$a_{object} = \frac{1}{\rho_{object}}\nabla P = -\frac{\rho_{fluid}}{\rho_{object}}\alpha$$

Let the relative acceleration be the difference between the object and fluid acceleration,

$$a = a_{object} + \alpha = \alpha(1 - \delta), \quad \delta = \frac{\rho_{fluid}}{\rho_{object}}$$

Therefore from using the fluid based derivation for motion of objects without Newton's Law of *gravity* we come to the same equations of motion, and it is left to the reader to reconcile that Newtons Law of *gravity* is only applicable to the heavenly bodies, that without invoking the assumption of *gravity* we reach the same conclusion for every other fluid. I emphasise that **the fluid field equations can recover Newtonian *gravity* by allowing the object to interact with the fluid, but is not needed to model motion on the Earth.**

The Dark Forces From The Ether

Using the fluid field equations, let us postulate an *ether* that permeates all of space and it's substance is a fluid that moves at the speed of light, under this simple analysis we will ignore the *gravitational* effects, and the spin or dissipation term of the *ether*. The acceleration due to the pressure is,

$$-\frac{1}{\rho}\nabla P \approx \frac{\Delta P}{\rho L} = \frac{c^2}{L}$$

Which is the observed cosmic acceleration attributed to dark energy, under the assumption of the *ether*, it is not a dark energy but rather the pressure gradient caused by the *ethereous* substance. Hence the field equations of the *ether* become,

$$\frac{\delta \mathbf{V}}{\delta t} = \frac{c^2}{L} - \nabla \frac{1}{\rho} \mathbf{E_k}$$

I propose that dark matter is the summation of the clumps of mass causing the kinetic energy present in the *ether*. Now assuming the *ethereous* substance moves at a velocity equal to the speed of light, and using the mass-energy equivalence,

$$M_{DM} \sim \int_V \frac{\mathbf{E_k}}{c^2} dV = \frac{1}{2}\rho V$$

This implies that if the *ether* exists, then the dark matter is the total mass of moving *ether* in the universe. If we let the density be the critical density ρ_c and V the volume of the observable universe then,

$$M_{DM} = \frac{1}{2}\rho_c V = 1.68 \times 10^{54} \approx 2.6 \times 10^{54}$$