STOE assumptions that model particle diffraction and that replaces QM

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Abstract

The STOE originally was a model to describe mysterious cosmological observations. The STOE has explained Young's Experiment and light as photons. It also predicted the result of The Hodge Experiment that differentiates between particles (photons) and waves going through the slits. This paper lists the assumptions used to form the equations. The advantages of the STOE are that it is one model of the big, the Newtonian scale, and the small of light and that it is more intuitive.

Diffraction, Interference, wave–particle duality, Newton Interpretation, Theory of Everything, STOE.

1 INTRODUCTION

Standard models of General Relativity (GR) and of Quantum Mechanics (QM) are contradictory. The long sought Theory of Everything (TOE) could be one or the other applied to the scale of the other or something entirely different. GR is a basic Newtonian model (matter warps space, space directs matter) which is the Scalar TOE (STOE). The STOE corresponds to both GR and QM. A summation of the application of the STOE to the universe is in Hodge (2015c).

The STOE suggests the One Universe Principle and its corollary that the universe is fractal (self similar) on all scales. The quantum world should obey the same equations as our everyday world. The surface appearance of the physical world is the same as its deep structure. The scale difference then requires new models to show the similarity. The QM model and its bizarre suggestions such as wave-particle duality, observer dependence, and entanglement need to be re-addressed in everyday terms. That is what the STOE does.

The STOE postulates there are just 2 constituents (after Democritus) and their interaction in our universe. The names given are hods for the discrete particles that are the smallest particles and plenum that is substantive and continuous. Their properties dictate their interaction. Hods warp plenum (like "space") and plenum directs hods trajectory (GR and Bohm Interpretation of

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QM) by the $\vec{\nabla}\rho$ where ρ is the plenum density. All the hods, Sources and Sinks in the universe determine the ρ at a point like Mach suggests. Matter is an assembly of hods with captive plenum.

One of the core pillars of QM is Young's Experiment and a model of the nature of light. The STOE model was developed in several papers to explain Young's Experiment by a computer simulation model of the photons trajectory.

A photon is needed to refute QM. Therefore, the Newtonian/GR view may become the TOE. Many papers (years) ago - the need was to form a basic model to address QM in everyday terms - wave or particle. A single model of light has remained a mystery. Yet such a model is at the core of a model of the small. Black body radiation, the photoelectric effect, and the Compton effect observations reject the wave-in-space model of light. The reflection, diffraction, interference, polarization, and spectrographic observations reject the traditional particle model of light. To refute QM, either (1) a wave model of the Black body radiation, the photoelectric effect, or the Compton effect needed to be developed or (2) a particle model of reflection, diffraction, interference, polarization, or spectrographic effects needed to be developed using GR and Newtonian scale assumptions.

Figure 5.c of Bush (2015) for "walking drops" and Fig. 1 of Hodge (2015b) for photons have a very similar appearance.

2 Assumptions specific to the simulation of light

The following is a list of the assumptions used to develop the equations for the computer simulation of Young's Experiment. They present some major differences relative to the standard model of light. However, they have analogies to big or the Newtonian scale and they are all needed to form the particle model that has experimentally shown to demonstrate diffraction.
(1) The speed of gravity (speed of a plenum) wave is $>> c$ (van Flandern 1998). This is not the speed of what has been called "information". Our instruments and we sense hods and only indirectly the plenum.
(2) The plenum supports wave action. Consider an oscillating string or pendulum. At maximum swing, the pendulum has minimum kinetic energy and maximum potential energy. At the stable point, the pendulum has minimum potential energy. If it is waving it also has maximum kinetic energy so it continues its swing beyond the stable point. Next consider the gravity caused by a mass. If the only effect present is a 1/r potential, the potential at a point would decline to the 1/r point and remain. If the mass moved, the potential would change to the new 1/r potential. There would be no over–correction. Therefore, the concept that the plenum (gravity) behaves as a wave implies there is an over–correction that is propagated in addition to the 1/r potential. This ability is because the plenum is postulated to have inertia. The characteristic of a wave in the plenum replaces the Huygens–Fresnel assumptions.
(3) Hods are 2 dimensional. Gravity affects the hods in proportion to the surface area presented to the $\vec{\nabla}\rho$. Following Lorentz the speed of light is the fastest

that any matter can travel because it presents zero surface to the $\vec{\nabla}\rho$.
(4) The hods cause gravity in the plenum. The plenum ("space") has inertia. The hods capture an amount of plenum to form matter (mass). Therefore, there is a proportionality between gravitational mass and inertial mass if each hod holds the same amount of plenum captive in matter (Hodge 2016). The amount of plenum captured depends on the ρ of the photon environment. This derives the Equivalence Principle.
(5) The speed of the hods and photons depend on the ρ. This is the Shapiro delay. This allows the hods to seek and find the minimum ρ in the plenum wave. Hence, the hods occupy a discrete distance of the number of wavelengths from other hods that is the quantum effect. The hods then become bound to other hods in a 3 dimensional structure. This is the "extent" characteristic of matter.
(6) Each hod that presents zero cross section to the direction of movement loweres the ρ. When the hod passes a point, the ρ oscillates. A photon is a column of hods. The secondary peaks of the diffraction effect show a spectrographic character. Thus, the diffraction depends on the energy of the photon that depends on the number of hods in the column. Therefore, the diffraction equation originates with the photon in analogy to a linear array of dipole antennas.
(7) "Observation" (measurement) is the action of the hods on other hods (matter) in sensing instruments. There is not "action–at–a–distance". Hods cause gravity (plenum) waves by direct contact and the plenum causes the hods to move by direct contact. The speed of the plenum wave causes the "entanglement" observations through wave resonance interactions (the Newtonian scale analogy).
(8) Because the plenum is ubiquitous, there is no such thing as an "isolated system".
(9) Like water waves approaching an island, when the plenum waves approach a minimum ρ around matter, the wave is reflected with a phase shift. The Transactional Interpretation (TI) is not a time–reversed wave but a very fast, emitted wave from the matter to be reflected back by matter to the source. Because the frequency is the same as the emitted wave, a standing wave is produced. The photon moves a small distance so that the standing wave directs the path of the photon depending on the surface area exposed to the $\vec{\nabla}\rho$. This is the action of the "walking drop" (Bush 2015), also.
(10) Reflection is also off all matter including observers. This is the origin of the "wave function collapse" (or similar models) in QM. Unlike QM, the STOE model has analogies in the Newtonian scale. The wires in the Afshar (Afshar 2005; Afshar et al. 2007) experiment have very low surface area that cause little effect.
(11) The most problematic assumption is the equation governing the flow of the plenum. If the plenum has inertia, there is a possibility to treat the force exerted by the plenum as a fluid flow with a gradient term plus a time derivative term. The analysis of rotation curves suggested that the time derivative is either zero or is proportional to the gradient. Therefore, gravity potential is only $1/r$ dependent. The STOE separated the inertia into two parts. One part was the plenum captured by the hods. This inertia moved with the hod because the

force holding the plenum is greater than the gradient force. This part of inertia then resists motion, as does the hod. The second part of inertia in resisting hod motion was assumed to be the substantive plenum moving around the photon and is proportional to the velocity of matter rather than velocity squared which would imply turbulence. The second part becomes negligible on larger scales.

Why is the screen display of Young's Experiment indistinguishable between a Fraunhofer (Fresnel, Sommerfield) wave through the slit model and the STOE model of a particle through the slit? Because the derivation of the force field directing the photon includes the Fraunhofer (Fresnel, Somerfield) model with the Huygens–Fresnel assumptions replaced by the characteristics of a reflected plenum wave. The photon emits a plenum wave. The effect at the photon is a reflected wave from a plane minus the contribution of a reflected wave from virtual mask atoms in the slit. The reflected wave from a plane has been developed in antenna models. It is as if the same source is perpendicular and equidistant from the plane. Its effect is to direct the photon forward. This limits the angel the photon may be diverted as it leaves the slit unlike the wave model. The virtual reflected wave (180 degree phase shift negates the minus sign and corresponds to the obliquity factor) from the slit then forms the force field with the same math as the Fraunhofer pattern.

3 Discussion and conclusion

The STOE simulation of Young's Experiment considers the photon causes waves in the plenum that are reflected by matter to direct the photon as General Relativity suggests. Consequently, any matter introduced into the experiment looks like the quantum mechanics "observer" induced changes such as wires in Afshar experiment, measuring equipment, extra screens, or masks.

The advantage of the STOE is that it is one model of the big of GR, the Newtonian scale, and the small of light.

The STOE is more intuitive because it postulates the universe is one and therefore, the Newtonian scale has analogies at the scale of the Big and small. The STOE corresponds to both GR and QM with appropriate simplifying assumptions. Further, it explains many problematical observations.

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