Ad hoc additions to theories suggest a new paradigm

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Abstract

The current, accepted theories in cosmology and quantum realms encompass observations that are not explained by the theory. A method to account for these observations is to suggest new, ad hoc additions to the theory. The ad hoc additions suggest the need for a paradigm shift to produce a simpler theory with broader scope and with a cause-effect physical interaction such as the Scalar Theory of Everything (STOE). Links to papers showing calculations and observational data comparison are found in Hodge, 2020, IntellectualArchive, Vol.9, No. 4, P. 14; DOI: 10.32370/IA_2020_12_3 ; See video:
https://www.youtube.com/watch?v=0YlJGdTvuTU
Inflation, negative energy, Dark Matter, action-at-a-distance, and Dark Energy are ad hoc additions to the Big Bang model of cosmology. Other problematic assumptions are spacetime, infinities, decreasing temperature, and increasing entropy of the universe. The strong force, weak force, and the orbits of electrons around a nucleus are ad hoc additions to the atomic models. Other problematic assumptions are the weird results from the assumption of the probabilistic nature of the universe and that the speed of light limits the speed of causality.

keywords: Theory of Everything, TOE, STOE

1 INTRODUCTION

The introduction of ad hoc assumptions with their accompanying complexity is a typical method to develop standard models. That is, a new assumption is introduced specifically to continue the accepted model against some new observation that doesn't fit in the standard model.

The ad hoc additions may suggest the type of paradigm shift that produces a simpler, broader model. For example, the Aristotelian model was a geocentric model of planets on several rotating around the Earth. The celestial spheres were holding the planets in their orbits and the stars on the perfect, unchanging

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outer sphere. Ptolemy added epicycles to explain the observed retrograde motion and kept the idea of uniform circular motion. This was an early recognition that would later be called the Fourier series. The Fourier series is a mathematical infinite (sine and cosine) series to calculate any periodic function. All that is needed is additional terms for the more complex functions. Aristarchus of Samos and, later, Copernicus suggested a heliocentric motion of planets. However, the Ptolemaic model was much more accurate. Tycho Brahe noted comets approached Earth from the star celestial sphere through the orbits of the planets and a supernova that was on the outer (star) celestial sphere. Therefore, transparent celestial spheres were not there and the heavens changed and were not perfect. Johannes Kepler used Brahe's data to form his laws of planetary motion that introduced elliptical orbits. Isaac Newton's gravity explained what kept the planets in orbit. However, the lack of parallax of stars remained a problem for the heliocentric model until the 1830's when more accurate instruments could detect the stars parallax in a much larger universe.

Newton's model (Newton 1730; Hodge 2020d) posited (1) the gradient of an aether density was a force that caused gravity and the diffraction of light and (2) corpuscles of light as components of matter. That is, support for the aether was because it could explain several observations then known but mysterious and it could provide a link between the big and the small.

The links to the Scalar Theory of Everything (STOE) model comparisons to observations are found in Hodge (2020d).

This Paper discusses the STOE resolution of several ad hoc assumptions in the cosmology realm (Section 2), in the atomic realm (Section 3), and in the subatomic realm (Section 4). The Discussion and Conclusion are in Section 5.

2   COSMOLOGY REALM

Cosmology models include postulates about the cosmogony of the universe. Because observation of times long past are untestable, the physics of those times are unknown. However, postulating the physics and the evolution of that physics should have conditions and rates of change that should be observed today. Therefore, cosmogony postulates are useful and should be treated as postulates.

Because the beginning of the universe must suggest something from nothing, such postulates must violate conservation laws or the universe must be postulated to have always existed. The latter allows infinities into the model that is also unfavorable.

2.1   Big Bang

The standard cosmology model considers the universe to have begun with a Big Bang with which all the stuff of the universe was created. After the creation, the universe expanded, matter condensed to form small atoms (H, He, Li), and

matter in fell to form galaxies. General Relativity (GR) is the mathematics used to model gravity, but is poor in describing the atomic and subatomic realms.

The galaxy formation model of matter falling into galaxies works well for elliptical galaxies and poorly for spiral galaxies (Binney and Merrifield 1998).

Nucleosynthesis of heavier elements occurred in stars and of lighter elements partly occurring at the Big Bang doesn't match the abundance of Li (Hoyle et al. 2000).

Ad hoc "Dark Energy" is assumed from the measurement of SN1a and was interpreted to indicate the acceleration of the universe expansion. The conclusion of the existence of Dark Energy has come into question (Nielsen et al. 2016; Colin et al. 2019). Because the standard cosmological model is of energy, the designation of "energy" is generic and refers only to the effect. The implication is that the "energy" is unknown.

Other problems include flatness (a Euclidian universe) and horizon problems. These suggested the ad hoc addition of a high density of relic magnetic monopoles. Thus, this caused the ad hoc introduction of "inflation" cosmology.

Ad hoc "Dark Matter" was assumed from rotation curves of spiral galaxies that showed a higher velocity than Newtonian physics allowed. It was considered non-baryonic. This postulate was also applied to observations of galaxy clusters. The observed Tully-Fisher relation (rotation curve velocity related to luminosity for flat rotation curves) is explained. However, it fails for rising and falling rotation curves. The fate of matter inflowing is unexplained.

Ad hoc Gravity is by action-at-a-distance and has no model for Machian influences.

Spacetime replaces the ad hoc gravity. In GR mathematics it may be interpreted to use the observed energy/momentum on the right hand side (RHS) of the field equation to be a mapping (transformation) to the "spacetime" of the left hand side (LHS). Then the inverse mapping provides observable data. Another view is that the "spacetime" is a physical warping that can direct matter.

Temperature of the Microwave background is the result of long term cooling by expansion of the universe. The value it has today is merely the measurement with no other theoretical reason for the value.

Entropy increases without limit. The speed of causality is postulated to be limited to the speed of light. However, observations of gravity speed (van Flandern 1998) and the coulomb field speed (de Sangro et al. 2012) suggest a much higher speed limit.

Time-symmetric equations are assumed which is inconsistent with observation.

2.2 Quasi Steady State Cosmology

The STOE return to Newton's path started with the Quasi Steady State Cosmology (QSSC) (Hoyle et al. 2000; Narlikar et al. 2008, 2015). QSSC suggests Sources of the stuff of our universe at the center of galaxies are emitting matter in Mini Creation Events (MCE).

A creation parameter was added to the General Relativity formalism. The MCE causes universe expansion. A "bounce" could also be conceived to form the cyclic universe models. A negative energy field was postulated to maintain the conservation of energy ideas. The creation field could also account for an accelerated expansion of the universe. The QSSC still includes action-at-a-distance and has no model for Machian influences although it is theoretically possible. The QSSC incorporates a cyclic universe model that, if coupled to expansion, breaks the time-symmetry.

The galaxy formation model of matter creation at the center of galaxies works well for spiral galaxies (Binney and Merrifield 1998) and poorly for elliptical galaxies.

Nucleosynthesis of heavier than hydrogen elements occurs in stars and of hydrogen at the center of galaxies. QSSC improves atomic abundance results and accounts for the outflow of hydrogen clouds from the center of spiral galaxies.

Ad hoc "Dark Energy" (the acceleration of the universe expansion) derives from the creation field and the creation of matter. This requires a negative energy in the universe. The Dark Energy ad hoc postulate is unnecessary.

Other problems (flatness, horizon, the high density of relic magnetic monopoles, and "inflation" cosmology) result from matter creation with a negative pressure, scalar field. However, equations with the "creation field" may not be solvable.

Ad hoc "Dark Matter" The rotation curves of galaxies are explained as a density medium directing bodies to vary as $1/d$ (where d is the distance from the Source) according to the spherical principle. Note the positive value causes an outward force on bodies in spiral galaxies. Matter moving outward combines to form heavier bodies that are gravitationally attracted inward in spiral galaxies. However, some matter escapes as the $1/d$ pushes it beyond the galaxy's influence. Therefore, there is no need for "dark matter". The fate of matter moving inward is unmodeled.

Gravity action is by action-at-a-distance. For the volume between galaxies to have low medium density, the universe must expand without limit. Because the Sources adds the stuff of the universe, the QSSC is potentially

Machian. However, there is no indication for how the Machian influence works.

Spacetime is also used in the QSSC with a "creation" term added to the RHS (the real side) of the GR field equation.

Temperature of the Microwave background achieves an average determined by the on/off cycles of new matter creation. These cycles must be synchronized but the model has no model for the synchronization.

Entropy If new matter is created at the beginning of cycles, a steady long term expansion creates a constant entropy.

Time-symmetric equations are used. However, if expansion is coupled with cyclic matter injection, then the absorber theory of electromagnetic radiation may apply (Narlikar et al. 2008). The equations become time-asymmetric. This is not the case for the Big Bang model or the simple cyclic universe model of Steinhardt & Turok (2002).

2.3   Scalar Theory of Everything

The STOE posits the existence of only two components that emerge to form the universe. The components of the universe are discrete hods and a continuous plenum that supports waves similar to Newton's corpuscles and aether (Hodge 2020d). These components enter the universe through Sources with a plenum density (ρ) at maximum. The spiral galaxies form around the Sources. Because the plenum supports waves, it has the property of inertia (Hodge 2016b, 2017a) and directs hods. Hods are a 2 dimensional, rigid, magnetic disk with a high ρ on one side and $\rho = 0$ on the other. Particles are assemblies of hods (Hodge 2016c).

The STOE posits a Sink in galaxy clusters in addition to the Sources of the QSSC model that lowers the ρ (Hodge 2019a,b, 2020b). Elliptical galaxies form around Sinks. The universe begins as a single Source that ejects other Sources (Arp 1998; Hodge 2020b). The entire universe emerges (strong emergence) from the two components and their interaction (Hodge 2016g).

The speed of plenum waves is much faster than the speed of light. The maximum speed of hods is the speed of light. Because the electromagnetic signals have a speed of light, these signal are of hods. Because the speed of coulomb fields is much faster than the speed of light(de Sangro et al. 2012), a coulomb field is a plenum effect. The STOE model was used to describe the particle explanation of interference effects (Hodge 2012a) found in Young's Experiment, the Afshar experiment (Afshar 2005), and the Transparent Mask experiment (Hodge 2019e).

The galaxy formation model The QSSC model of matter Sources forming spiral galaxies and of matter condensing to Sinks in elliptical galaxies works well (Binney and Merrifield 1998). The stuff of the universe expands

outward from Sources or inward to Sinks. The hods form bodies whose influence warps the plenum. These actions obey the spherical principle in the Euclidean space. Hence, the inverse distance (r^{-1}) terms in the plenum density (ρ) equation (Hodge 2020d).

Nucleosynthesis of all heavier than hydrogen elements occurred in stars. Sub-atomic particles and hydrogen formation occur near the Source. Hydrogen gas outflows as measured by the clouds of shocked hydrogen moving outward from the center.

Ad hoc "Dark Energy" is unnecessary because the cyclic nature of the temperature of the universe has an expanding phase in the distant past (Hodge 2006a). That is, the requisite "energy" is thermal rather than some exotic form. Further, the organization of the universe is of cells of Sources and Sinks that form galaxy clusters.

Other problems The flatness and horizon problems are explained by a scalar field of an existing plenum. Because the hod is a magnet, magnetic monopoles are non-existent. The ρ at a point is relatively easy to calculate unlike the QSSC "C field". Because all matter, Sources and Sinks contribute to the ρ at a point, the STOE is Machian.

Ad hoc "Dark Matter" is unnecessary because the $\vec{\nabla}\rho$ was from the Source and causes a force on matter in the outer galaxy that causes the deviation from Newtonian mechanics (the "missing mass" problem). That the $\vec{\nabla}\rho$ is also influenced by other galaxies explains the asymmetry in the rotation curves (Hodge 2006c), which remains a mystery in other models. The STOE includes the reason why the Tully-Fisher relation works plus a modification that allows the inclusion of rising rotation and falling rotation curve galaxies. The $\vec{\nabla}\rho$ also has a lens-like effect on passing light as Newton suggested (Newton 1730). The fate of matter moving inward in spiral galaxies is to condense to supernova that sends some matter out of the galaxy. The remainder condenses to black holes which are disintegrated in the very high ρ near the Source and reradiated.

Ad hoc gravity action is by contact. The hods cause the plenum to warp, the warp travels at a speed much greater, but finite, than the speed of light and its gradient causes a force on the surface of another hod. The speed of gravity is the speed of causation.

Space and time are a backdrop to the physical universe and are mathematical tools, only. Reality is the objects, the distance between objects, and the duration between events in the universe.

Temperature of the Microwave background is the result of heating in Sources (spiral) galaxies and cooling in Sink (elliptical) galaxies. Because matter requires time to move from Sources to Sinks, there is a temperature of the universe. Therefore, the temperature hunts the long-term average

temperature somewhat like a thermostat controlling the temperature of a room. Thus, various universe characteristic formed long ago (far away) such as the abundance of radio sources are in a volume with a different temperature.

The current (local) universe temperature is declining but still slightly above the long-term average. The temperature is primarily determined in each galaxy cluster. However, because the movement of photons and plenum among galaxy clusters transfers energy, the temperature of the clusters may oscillate in synchrony. So, "negative energy" which seems necessary as an ad hoc addition to the Big Bang and QSSC models is unnecessary in the STOE.

Entropy is low at Sources and increases outward from Sources. The flow of the components of the universe to Sinks oscillates with the temperature. The long-term average temperature suggests the long-term average entropy of the universe is constant. The interaction of the hods and plenum is that hods warp the plenum and the plenum directs the hods. Thus, the speed of causality is the speed of the plenum wave that is much faster than the speed of light. Further, all interaction between bodies is the speed of the plenum changes that is the speed of causation.

Time-symmetric equations are not assumed which is consistent with observation. Because "time" is the duration between events and the events are the flow of the components of the universe, the constant entropy implies the functioning of the universe is not time-symmetric. That is, as hods and plenum move from Sources to Sinks, they form larger bodies.

Many observations suggest several parameters are "fine–tuned" such as the temperature of the microwave background. Fine–tuning is explained as the processes of forming larger bodies involve some physical control (feedback) of the input by the output level [see the example of CMB temperature (Hodge 2006a)].

3 THE ATOMIC REALM

The discovery of phenomena suggesting an atomic structure resulted in attempting to describe the spectra as an orbital (angular momentum) characteristic of electrons (Herzberg 1944). This became untenable because radiation should be emitted and none was observed. Later attempts became weirder by using Quantum Mechanics combined with many ad hoc exclusion rules.

The results of several experiments in electricity and magnetism were combined into Maxwell's equations. Because the experiments were independently done, several simplifications resulted in incorrect descriptions (Hodge 2018c,d,e,f). The *base* for Maxwell's Equations is an *electrical charge* that then causes magnetism and the electromagnetic forces. The observation of two types of magnetic fields (Hodge 2018f) imply the hod is either rotating charges or is a permanent

magnet. Because rotating charges would emit radiation, the rotating charge model is rejected in the STOE. Therefore, the hod is a permanent magnetic (Hodge 2018d).

Magnetism in the STOE model is postulated to emerge from the hods and plenum. *Magnetism* is the *base* for modified Maxwell's Equations. Magnetism is observed in small subatomic particles and light. The application of the $\vec{\nabla}\rho$ follows the magnetic lines of force seen in iron filings at the macro scale. The self-similar (fractal) postulate suggests disk permanent magnets are a macro object that is analogous to hods.

Repulsion of a column of disk permanent magnets was measured. The measurements showed an asymmetry between South poles repelling and North poles repelling (Hodge 2019f). Further, the repulsion force along the axis was inverse–distance when the magnets were close, inverse distance–cubed a bit further, and inverse distance–squared still further apart. The repulsion force perpendicular and centered on the axis was inverse distance–cubed of the distance for the dipoles.

Particle magnetic fields were studied (Hodge 2019g) for proposed structures of photons, neutrinos, and electrons.

Electromagnets did not show the asymmetry that the permanent magnets demonstrated (Hodge 2019h).

Atomic structure in the standard model is orbiting electrons. Also observed is that energy radiation is light (photons). Photons in the STOE are columns of hods. So, the STOE atomic structure is of rods of photons determining and magnetically holding electrons in position around the nucleus (Hodge 2019i). Included is how the magnetic structure results in ionic and covalent bonds form.

Ad hoc gravity emerges from magnetic effects in hod structures (Hodge 2019j). Magnetic attractive and repulsive effects determine atomic structures. Therefore the distance required before an only attractive force is at least the atomic scale of Angstroms. That is, the "gravity" at more than atomic scale is an approximation which becomes invalid at less than atomic scale rather than being present and merely too small. The distance at which this occurs may determine atomic size. The relative strength of the photon hod binding and the gravity speaks to the "hierarchy problem". The Newtonian problem of $r \to 0$ causing an infinite force is nonexistent.

The inverse distance squared noted for gravity occurs at distances greater than the atomic radius and is due to the spherical principle. That is, the net effect of the atom's magnets is to cause a depression in the plenum as Newton suggested.

ad hoc nuclear forces (weak and strong) were proposed because the electric model of the atomic nucleus had repulsive protons in the center. Protons

and neutrons are modeled as an assembly of hods into a spherical ball of magnets (Hodge 2020c). Because the axis of the magnets on the surface of the ball is always tangent to the ball, the $\vec{\nabla}\rho$ force close to the nucleon ball is always attractive to other hods (magnets) and inversely distance cubed close to the nucleon.

Grand Unified Theory is, therefore, that the magnetic force evolves into the four manifestations of force of the GUT. There is only one force - the $\vec{\nabla}\rho$ - and the ρ is determined by all matter, all Sources, and all Sinks in the universe.

4   THE SUBATOMIC REALM

Young's experiment of interference was interpreted to indicate light was a wave rather than Newtonian corpuscles directed by aether waves (Newton used a rock-thrown-into-water analogy) (Newton 1730). This began the effort to attempt to explain observations of the small scale by waves, fields, etc. This effort has resulted in the very counterintuitive (no analogies with the classical world) Quantum Mechanics (QM).

Our experience in the classical world suggests effects are transmitted by contact. However, probabilistic mathematics used in QM has been effective. The STOE suggests the effectiveness is because all effects are related to all other effects in a Machian universe. That cause-effect is unmodeled in QM indicates a lack of a theoretical physical model and indicates a conceptual issue for the arrow-of-time.

The STOE suggests modifications to Maxwell's Equations that better agree with experiment. The Biot-Savart Law was restated (Hodge 2018b,c,d,e). There are two different types of magnetic field, each with the same symbol ($\vec{B}$) (Hodge 2018f).

The emergence of the hod and the plenum of the universe is achieved by the structures and the behavior of various structures. The magnetic characteristic of the hod affects other hods. The force exerted through the plenum can attract or repel depending on direction. It has a distance zone perpendicular to the hod surface that is inverse distance related, that is inverse distance squared related, and that is inverse distance cubed (or exponential) (Hodge 2019f). This provides many different structures.

The characteristic of the hod as a rigid surface suggests the two hods strongly attract perpendicular the their surface (the hods surfaces are parallel and co-axial). Therefore, a strong tendency for hods to align themselves and form in the inverse distance region (very close) causes the structure of particles. Thus, photons are formed as a column of hods. Note that greater distance or slight misalignment of the axis results in a weaker force.

The hod is modeled as a surface with zero cross-section area. Therefore, the $\vec{\nabla}\rho$ on the surface of hod produces no movement or resistance to movement perpendicular to axis of the hod. Therefore, the speed of the hod is maximal

perpendicular to the axis. All hods in a photon are axially aligned. Because hods are two dimensional, they and photons experience no impressed force in their direction of travel. They attain the maximum speed allowed by the plenum. Because electromagnetic signals speed is that of light, electromagnetic signals are hods (Hodge 2018d).

Photons are a column of hods with an amount of plenum captured by each hod (Hodge 2012a). Because the plenum has the inertia property to support wave propagation, this is the cause of the inertial mass of bodies. The Equivalence Principle suggests each hod, that causes the gravitational warping of the plenum, captures the same amount of plenum wherein the inertia resides.

The formation of a column of hods has an always-attractive direction perpendicular to the photon axis. Further, the attractive tendency is to form a "T" (perpendicular axes). These structures can be strong or weak to form larger particles such as neutrinos and electrons (Hodge 2016c). That the weaker possible structures are the anti-matter particles is the reason anti-matter particles are much less numerous in the universe.

Collider experiments show effects that are modeled as particles with short life. The short life of particles indicates a weak structure. The lengthening of the photon also may account for size limitations on the structure of particles. This model suggests long chains of hods may be more easily broken. Consider two electrons held by a long photon similar (the self-similar postulate) to an atom that has stable particles magnetically held by photons. Like two weights at the ends of a bar, the longer bar breaks more easily. The longer photon becomes prone to breaking. This suggests a limit on the size of particle as well as why many particles are unstable. This may be a method to model the subatomic particles.

Electrons are modeled with a surface presented in all 3 directions (Hodge 2016c). Therefore, their movement is always limited to a speed less than that of light. Further, electrons tend to orient with minimum surface area presented to direction of movement. Because some hods will have a force exerted on them as particles travel through the rapidly changing plenum, the $\vec{\nabla}\rho$ may spall hods from particles or provide a volume where hods may join to the particle. Spallation is also noted in galaxy redshift (Hodge 2006b) and in the Pioneer anomaly (Hodge 2006e). The orientation of these hods from electrons traveling along a wire then form the magnetic (electromagnetic) field around the wire in the Biot-Savart experiment (Hodge 2018d). The STOE suggests the orientation is the cause of the magnetic field to be only perpendicular to the wire and not as the Biot-Savart Law in Maxwell's equations. The forces caused by the electron's travel direction and the magnetic field cause the results of the Stern-Gerlach experiment (Hodge 2016f).

Therefore, if the "mass" measure of a subatomic particle involves a magnetic field and the direction of travel, the amount of surface area relative to the number of hods is important. That is, the structure may cause a false view of the measurements. For example, a photon will not react to another body perpendicular to its axis. That is, the photon will appear to have zero gravitational mass from a direction perpendicular to its axis and perpendicular to its travel

direction. However, in a direction along its axis it will appear to have the full hod count of gravitational reaction. Whereas, baryons larger then the electron will appear to have approximately one-third the hods being $\vec{\nabla}\rho$ affected. The structure will change this ratio.

The distance between hods is inversely proportional to the ρ in the neighborhood of the photon. This proposition was included in the toy simulation of photon interference (Hodge 2012a). The shortening of photons may account for the breaking of the "T" structure (Hodge 2021) and the dissolving of black holes in the center (very high ρ) of spiral galaxies.

5   DISCUSSION AND CONCLUSION

A cause-effect model should be a part of the theories. However, the plenum causation is not directly observed. The STOE becomes more intuitive by invoking cause-effect and by invoking the self-similar postulate.

Part of the justification of postulates is their applicability to size scales from the cosmology to the subatomic.

The addition to the STOE of the idea of "structure" to the two components and their interaction allows the emergence of the objects and of movement. The structure characteristics provide geometry mathematics. Particles have an intrinsic direction in space and time. Objects are observed to be ordered in distance and time in the classical realm. The spherical property in 3 dimensions from a point applies to a Euclidean space and time coordinate system. So, counting and structure provided by the nature of the universe dictates the mathematics we use (Hodge 2015).

The STOE views the idea of "infinity" as a fudge factor in physics. Its use in mathematical physics means objects greater in distance or duration have little effect on the parameter in question. This is an assumption that should be verified. The STOE self-similar postulate suggests every scale in the universe is self-similar to every other scale. Therefore, that we observe limits in classical scale suggests other scale observations also have limits. Therefore, the universe is bounded with an edge. However, the STOE allows the galaxy clusters and the universe (1) to be expanding by adding matter (Source rates are larger than Sink rates) and by adding new galaxy clusters or (2) to be shrinking (Source rates are less than Sink rates). That is, the temperature of the galaxy clusters indicates the processes in the cluster.

The STOE is a model of forces not energy. Energy is calculated as a force exerted over distance and duration. The force is exerted by the ubiquitous plenum on bodies. The plenum is warped by not only bodies (hods), but also by Sources and Sinks. However, the local calculation of energy may ignore Source and Sink contributions and dissipative contributions (entropy).

The Universal Equation can be applied to all size realms. By considering the contribution of various terms as being too small, the calculations are much simpler. For example, the model of rotation curves considered only the target galaxy Source. Whereas the model of rotation curve asymmetry also considered

neighbor galaxies (Hodge 2006c). The model of the Planet 9 (Hodge 2019c) and the Pioneer Anomaly (Hodge 2006e)considered only one galaxy Source. Therefore, the plenum and structure inclusion is more complete. That is, the plenum ρ throughout space replaces the gauge theories.

The ad hoc additions to current models suggest the need for a paradigm shift to produce a simpler theory with broader scope and cause-effect physical interaction such as the Scalar Theory of Everything (STOE). Inflation, negative energy, Dark Matter, action-at-a-distance, and Dark Energy are ad hoc additions to the Big Bang model of cosmology. Other problematic assumptions are spacetime, infinities, decreasing temperature, and increasing entropy of the universe. The strong force, weak force, and the orbits of electrons around a nucleus are ad hoc additions to the atomic models. Other problematic assumptions are the weird results from the assumption of the probabilistic nature of the universe and that the speed of light limits the speed of causality.

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