Advance Physics

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Introduction

A summary of theoretical physics since its inception with Isaac Newton. From classical physics one moves forward all the way to advance physics. Advance physics will detail all current line of progress on research in physics that has been gathered from PHPR and the Scientific Age. What that line of progress in physics means for the philosophy of science and then one gives a short conclusion.

Classical Physics

Isaac Newton laid the basis for the development of classical physics by his studies on motion and gravitation. That is Newton's three laws of motion and the gravitational force. Where the gravitational force is the force between two masses separated by a distance d. Even then force can be seen as the multiplication of mass and acceleration $F = ma$. Isaac Newton showed the fixed aspect of time and the static nature of cosmology.

Classical field theory led to realization of magnetism and electrodynamics. That is the attraction and repulsion of charge particles, the field behavior of magnetism and charge particles, and the dynamics of electromagnetism that culminates with James Clerk Maxwell's field equations.

Maxwell's equations led to a hint of contradiction of classical physics as field theory is a non-linear system with variation in motion and differential in time. That is classical fields, which were understood to be Euclidean, now seem to be more inclined to be hypergeometric. Leading to the development of manifold theory and classical topology.

Modern Physics

Modern physics has been at the forefront of 20th century advances in the natural sciences. Starting with Albert Einstein's relativity the notion of space and time change. No longer is time an independent reference frame but that space and time is Minkowski space-time. The concept of the Poincare group in relativity utter the asymmetry between matter and energy. That is light, which poses significant problems in classical mechanics to our notion of Euclidean space and independency of space and time, travels at a constant speed call c.

Since light is constant then when any observer approaches c time dilates from its own reference frame. One example of the consistency of c is the ideal thought experiment that when traveling on a train, on a constant velocity of v, a lightening hitting two tree branches at the same time, from a distance apart d, will seem, to the observer on the train, looking through the glass window, to hit the closer one first and the second one a few milliseconds later that is t and t'.   That is our notion of light changes our entire notion of space and time. In which time is the fourth dimensional extension of three dimensional space – call Minkowski space-time. To go even further energy is equivalent to matter and so when an object an object with mass m wants to move further toward the speed of light more energy is needed to do so and so mass increases. So then the conclusion is that light is made up of massless particles call photons.

The revolution of special relativity established the now famous equation E = mc^2. Here the problem of light push further as wave-packets that carry discrete energy that when the wave-length of these light particles gradually increases energy, at a certain point, remains constant that is Einstein's realization of the photoelectric effect that led to quantum mechanics.

But before heading into quantum mechanics one must be reminded of the subtle relationship between gravitation and light. That is gravitation, when giving a mass m, and a light beam that passes mass m, bends light in a fixed geodesic curvature. This is the equivalence relationship between acceleration and gravitation. The foundation of the asymmetry between matter and curvature call the general theory of relativity express by Albert Einstein's field equation.

The advances in special and general relativity due in part to significant progress in Riemannian geometry and group theory especially differential forms and Lie algebra.

Quantum mechanics came to fruition with the realization of the Neil Bohr atom. That is an electron particle of discrete energy revolving around a nucleus of a certain number protons and neutrons. With Werner Heisenberg's Uncertainty Principle, the atom can be seen, as for example the Hydrogen atom, to be an electron within a certain range from the nucleus. Erwin Schrodinger's equation showed the interrelationship between wave-packets and particles.

In large part a quantum system can be seen to be a Hilbert space between any number of quantum states. Each quantum state can be seen as a wave-function that is the behavior of a quantum particle; mainly mass particles with discrete energy. Any measurement of such quantum systems causes a slight perturbation that arouses the uncertain momentum and position of such quantum particles.

Paul Dirac then set in motion quantum field theory. Merging special relativity and quantum mechanics into a low-energy effective field theory through the discovery of particle and anti-particle interactions. Richard Feynman extended Paul Dirac's work into the realm of quantum electrodynamics with the application of the path-integral formalism and the canonical form. Further advances in quantum field theory led the development of quantum chromo-dynamics, electro-weak and the Higg's force. All quantum interactions mediated by a zero-mass force particle, call the bosons, between matter particles call the fermions. Where supersymmetry relates bosons and fermions in which each matter and force particle has a supersymmetric super-partner.

The ultraviolet divergence brought up by unifying quantum mechanics and general relativity are tantamount. So the only probable resolution to eliminating those divergences is by supposing that matter and force particles are made up of open and close strings; respectively that inter-tangle, twist and twirl with each other on a membrane D-manifold. This is supersymmetric strings in a compactified 11-dimensional hyperspace. Four candidates were first identified in which one of four, through mirror symmetry, is the prime candidate call M-theory.

Advance Physics

Advance physics starts with the notion that abstraction is redundant and that the elimination of abstraction by imposing logical form brings clarity and order to the physical sciences. That is that there are mathematical anomalies in physics which can be eliminated simply by eliminating redundant features. These anomalies are, nevertheless, properties which have relevance to experimental adequacy but remain, even then, too meaningless to consider.

The development of computational control and SUPREME led to the idea that much of theoretical mathematics can follow straightforward computational procedures. That the Wilson operator for multiple quantum states can serve as the model procedure for understanding what is now to be variant [of stringy]'s. Variant [of stringy]'s resides on the D-variant manifold. The model stringy being the first identified solution to stringy which in its crude form is the Yang-Mills Gauge Analog. An analog that is a membrane solution to all the other three candidates of M-theory.

These variant [of stringy]'s reside in metamorphic space. All variants of prime contain unique mathematical properties that give analogues physics in terms of the quantum field approximation. And by which, through prime factorization variant [of stringy]'s, don't endlessly replicate.

Though Advance Physics is relatively new there is wide-ranging speculation of where advance physics is heading into in other realms of the natural and social sciences. Current advance physics will have a lot to say about the philosophy of science. Especially the problem of complexity and simplicity, the adequacy of the paradigm shift and metaphysics in general.

There is also the question of experimental adequacy in epistemology and the failings of Platonism over Aristotle.

Other sciences will benefit from Advance Physics by taking seriously the concept of computational control in bio-engineering for harnessing exotic and novel new cellular-life forms or the use of the mathematics of SUPREME to achieve more refinement in the use of nuclear-fusion energy or simpler methods for achieving tasks in robotics in terms of components and computation control. SUPREME will, within the philosophy of science, have much to say about the role of progress in cosmology and whether the universe is not just expanding and accelerating but also rotating in which questions of shaping space-time surmount.

In all Advance Physics follows from the achievements of PHPR and the Scientific Age. In which further achievements will contribute to the foundations of Advance Physics and its relationship to the history of physics.

Conclusion

A short exploration of the history of physics has been giving. Over the next many decades to a few centuries physics will continue to serve as a vital foundation of the sciences. As further progress in PHPR and the Scientific Age continue more knowledge of physics will be ascertain and establish in Advance Physics.