A NEW UNIVERSAL PHYSICS
from
The Origin and Its Meaning
by Roger Ellman

Introduction

The objective of Science is to describe the material universe, that is to describe what it consists of and how it behaves. The pursuit of that objective has no end because there is no independent solution against which to compare progress. Rather, science can only apply rational thinking and procedures to the problem, seeking to get ever closer to what that independent solution would be if it were available. The universe is as it is, but to obtain a full and accurate understanding of it is difficult.

In the first part of the 20th Century science adopted two significant conclusions:

(1) Quantization and the particle nature of material reality;

> This was a result of Planck's radiation theory, Bohr's model of the hydrogen atom electron orbits, and Einstein's photoelectric effect hypothesis.

(2) Relativity and the non-existence of a medium, of an "aether".

> This was the outcome of a struggle between two schools of thinking: the one pro-"aether" and championed by Lorentz, the other anti-"aether" and championed by Einstein.

Those conclusions both relate to the problem of the nature of light. Light exhibits many forms of behavior that require it to be wave in nature, yet the discoveries of Planck, Bohr and Einstein appear to require quantization and a particle nature for light. The problem of light, never really solidly resolved, was also part of the problem of an "aether".

This paper contends that both of those conclusions were partially in error, that the paradigm of contemporary physics based upon them must be replaced with a paradigm that is better (in terms of science's objective as discussed) and more useful (enabling substantial progress in areas where physics has been stymied).

An Analogy or Illustration: The Effect of Copernicus

This type of situation has happened before and the major shift in the paradigm of astronomy from Earth-centered to Sun-centered, attributable to Copernicus, has characteristics that illuminate the current issue.

Before Copernicus the assumption that the Earth was the center of the universe appeared eminently valid.

- It was "obvious" to ordinary people of the era, who lacked our knowledge of the solar system, that the Earth was the center of everything.
- Their legends, philosophy or religious dogma were likewise based on the Earth as the center of all.
- Astronomy functioned quite well with that concept.

For science the last point is important. Over centuries the astronomers, the wisest of their times, who accurately predicted seasons, eclipses and conjunctions, had essentially no problem with the geo-centric system that they used.

Their hypotheses included orbital cycles and sub-cycles ("epi-cycles" or cycles on cycles) to account for the motions of celestial bodies as observed from Earth. Their system served well for much longer than our science has existed. It gave correct exact results. What else could one ask of a hypothesis meant to correctly describe natural reality ?

Yet, their system did have problems. Their geo-centric hypothesis was wrong. Their system was a travesty of correct representation of reality. But, without our technology how could the pre-Copernican scientists have known that ?

Actually, over time the problems became progressively clear to them. With more data and better observations they continuously had to introduce further adjustments to their system. The pre-Copernican astronomy that began auspiciously with simple postulates and resounding success was becoming a patch-work of ever more adjustments and ever less success.

Copernicus did not suddenly have a vision. Nor did he have our information about space. But, he was immersed in the problems of the astronomy of his day. And, he had the imagination to see that something major was wrong and to look for, and find, a solution.

The lesson of that experience in astronomy is that there is something wrong in a system of science if it:

- has increasingly more complex hypotheses,
- requires continuous further adjustments, and
- struggles to deal with new data that become available.

That geo-centric astronomy functioned satisfactorily in its early period did not mean that its principles were accurate, and its progressive failures as better data developed were strong indication that its principles were not correct.

<u>The Copernican-Like Crisis of Contemporary Physics</u>

That is precisely the situation with 20th Century physics. Consider the indications.

- The abstruse mathematics, some of it developed just to deal with the ever more abstruse thinking that 20th Century physics has needed.

- The wave versus particle problem of light never explicitly resolved.

- The myriad "fundamental" particles of high energy physics and the constant adjusting of models of the "building blocks" of matter.

- Ridiculous assumptions or conclusions such as that conservation does not apply to quantities if they are less than the related Heisenberg uncertainty.

- By-passed problems such as the means that causes the "stable" atomic orbits to be stable.

- "Field" as the explanation of action-at-a-distance without addressing what field is and how it does what it does. "Field" is a prime case of a code-word covering the inability to address a problem.

- The inability to successfully address the problem of gravitation.

· Conflicts such as "static" electric field that, in spite of being "static" must not transmit any effect at more speed than the speed of light. How ? Why ?

· Insistence on "pure" relativity when all the evidence is clear that there is a prime frame of reference (not a preferred one nor one with different laws, merely the frame that is most fundamental and comprehensive).

· "Aether" denial with no resolution of the problem of in what does electromagnetic wave propagation exist.

The Proposed New Paradigm

There are two components to the proposed new paradigm.

(1) Material reality is fundamentally wave in nature and continuous, not particle, not quantized.

(There are some physical effects that appear to be quantized, in particular atomic orbital and spectral activity and Planck or Rayleigh-Jeans radiation. These are not "quantized" in the sense of 20th Century physics. They are subject to mechanical restrictions that allow only discrete cases.)

(2) There is a universal medium, "aether", but not the passive "fluid" as traditionally thought of. The medium and electric field are essentially the same thing. The medium is the medium of all "field" and produces Grand Unification of all forces and fields.

There is a "prime" frame or system of reference. It is the frame of the original "big bang" defined now in two ways: the gravitational field that permeates space and the Doppler effect in the background cosmic radiation yet remaining from the "big bang".

The only adjustment to the system of Einstein relativity is that transformations from a current to a new frame of reference should be performed first from the current frame back to the prime frame and then from the prime frame to the new frame.

The nomenclature "relativity" has always been inappropriate. "Relativity" should properly be termed "invariance". As Einstein insisted, the laws governing the behavior of the universe and the constants that appear in those laws are invariant regardless of the frame of reference. The universe must be and behave the same everywhere.

But, why bother with this new paradigm ? Even if it is closer to the "correct solution" what good does that do us ?

The process of science has been the accumulation and organizing of data and the developing of a hypothesis when there is enough data (and enough imagination and skill in the scientist). Then the hypothesis is tested against further new data, adjusted as appropriate and so on.

The new paradigm is the result of a new approach to the developing of physical hypotheses. It is a deduction from the starting point of before the "big bang", from the very

beginning. Without neglecting any data or physical laws, and using only those upon which 20th Century physics is based, the new process has been pure rational deduction and logical derivation. As such it is all reproducible. It involves no new experiments nor new observations or data.

The starting point is one assumption: that an infinity is impossible in material reality. From that starting point the cause and nature of the "big bang" have been deduced and correlated with our contemporary universe.

From that starting point the fundamental laws of physics, all heretofore empirical, have been derived.

· Coulomb's law · Newton's laws of motion · Ampere's law
· Newton's law of gravitation

From that starting point all of the above reviewed problems of contemporary physics have been overcome, analyzed and resolved.

In this new Universal Physics that fundamental quality of matter, mass, is a calculated quantity, calculated from the innate nature of matter.

In this new Universal Physics the nature and mechanism of gravitation is fully developed and gravitation is incorporated into the rest of physics. New light is also shed on the gravitational behavior of "black holes".

What is field ? Why is the speed of light what it is ? How does the radioactive exponential decay happen ? What is the structure of matter including why atomic nuclei are as they are ? All of these results and many others fall out naturally from the new physics developed as just described.

The two components of the new paradigm are part of those results. No conflict with the data of material reality is involved and only the paradigm aspects cited are a conflict between 20th Century physics and this new Universal Physics.

And this has been done using mathematics no more complex or abstruse than differential and integral calculus and the quite simple second order linear differential equation with constant coefficients.

This new physics includes an entirely new development: the universal decay. The entire universe, its matter, its energy and its fundamental constants, are all undergoing an exponential decay with a very long time constant estimated to be about 11.3 billion years and calculated independently as 11.3373 billion years. That decay has been going on since the origin of the universe, of course. Its effects have special significance for astronomy and cosmology.

Conclusion

This summary paper cannot present the full development, which is in the author's book "The Origin and Its Meaning" and consists of many hundreds of pages of text, mathematics and figures. That full development is a comprehensive and complete derivation of the present universe, of the physics of our contemporary physical environment, from the very beginning forward, with nothing left unaddressed, nothing by- passed, nothing avoided.