

THE ORIGIN OF NATURAL LAWS, COSMOLOGY, AND FUNDAMENTAL PARTICLES

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DEDICATION

This article was especially prepared to commemorate the 25th anniversary of the Science Faculty of the University of Kelaniya, Sri-Lanka, an institution associated with the University of Sri-Lanka and for many centuries a centre of Buddhist teaching. The theme of this article is to present a new theory of the nature of matter using a wave theory rather than a particulate concept.

It is important to recall that 2500 years ago there were two philosophical beliefs of the structure of matter: the atomistic theory of the Greek Democritus and the non-particulate theory of Pythagoras. The Pythagoreans joined their views of Nature with the destiny of man, similar to Buddhist teaching. The Pythagoreans believed that the goal of mankind was to improve their moral and ethical values, not to be subservient to the church and God.

Today the philosophy of Pythagoreans has withered largely due to the opposition of the medieval church which found Pythagoras' teaching in conflict with the notion of God and a Trinity. The endorsement of Democritus by the ancient church accounts for the popularity of atomistic concepts of matter today.

However, shortcomings of the particulate concept have appeared. Leading geometers, Clifford (1860-1895) and Herman Weyl (1885-1955) suggested that matter was a manifestation of the structure of space. The quantum theory (1926-1936) brought further paradoxes and doubt of particle ideas through the work of Erwin Schroedinger, Paul Dirac and others. Today, serious physicists will not contend that particle-like electrons encircle atomic nuclei. Nevertheless, Democritus' concepts are so firmly imbedded that most popular writing still teaches the existence of point-like electrons in planetary orbits. Many scientists today believe nuclei are point particles or contain them.

This article, given to a forum at a venerable Buddhist institution, presents a radical new scientific concept challenging current ideas of the nature of matter. It will be counter-challenged, of course. Yet, such are the shifting fashions of human belief that this new concept would probably have been regarded as very reasonable if advocated 2000 years ago in Greece or Sri-Lanka.

ABSTRACT

Our knowledge of science, nature, and the universe is based on six physical laws which govern the behavior of three fundamental particles. The laws are the six sets of rules for calculating electricity, gravity, relativity, quantum mechanics, and conservation of energy and momentum. The three dominant particles are, of course the proton, neutron, and electron. The origins of these laws have, however, been shrouded in mystery. Quantum mechanics, and relativity have been known a scant sixty years, and we know nothing of their origins. The rules of gravity, conservation of energy, and conservation of momentum have been with us for two centuries. During this time, we seem to have forgotten that we have no idea of what causes them.

The primary purpose of this paper is to describe a space resonance particle model and how it may provide an origin of these six laws and thereby underlie science, nature and the structure of the universe. The leading player in the new scenario is space, that emptiness of which we often speak but know so little about. The properties of particles and the laws which govern them are derived from properties of space. The resonance embodies a mechanism to exchange energy without the need of particulate charge or mass substance.

The space-resonance ^(1,2) is a physical model of the electron which you can visualize in your mind like any familiar object. It is comprised of two spherical scalar waves traveling in space with velocity c ; one inward to a center and the other outward. The two waves form a standing wave; hence the term space resonance. Incorporating this new model required completely scrapping the age-old point particle and replacing it with the space resonance plus an energy transfer mechanism.

The origins of the natural laws are found embodied in the properties of such space-resonance particles and their mutual interaction. Relative motion of two space resonances results in a Doppler modulation that contains the deBroglie relation $\lambda = h/p$, the Compton wavelength h/mc , and the relativistic mass transformations. Two assumptions concerning properties of space provide a mechanism for energy transfer, leading to the force laws and conservation of energy. When combined with spherical rotation of space surrounding resonance centers, the model provides spin and a physical structure for the Dirac Equation. In combination with the Hubble expansion as a perturbation of charge force, the law of gravity is found, leading to a confirmation of Mach's Principle. Newton's second law is found as a similar perturbation due to acceleration of particles.

Surprisingly, the theory reveals an intimate relation between the structure of the smallest things; electrons and protons, and the largest, the universe itself.

A THEORY OF EVERYTHING

Scientists have long realized that in the 20th century, two great theories have dominated the physical world: Quantum mechanics with its resounding success in explaining subatomic behavior, and Einstein's theory of relativity which governs physics at large velocities and cosmic distances. These theories are distinct, each employing different mathematics, each making astonishingly accurate predictions in its own