Physics needs nothing less than a Renaissance

-- on the relation between physics and philosophy

Ling Jun Wang

University of Tennessee at Chattanooga

USA

The Dream of unifying all forces

- **Ever since the unification of electric and magnetic fields by James Maxwell, the unification of gravitational and electromagnetic fields has become the dream of physics community since early 20th century.**
- **The early attempts of unification by Weyl, Eddington, Kalusa and Einstein all failed.**

. **Unification along the approach of quantum field theory is called *Theory of Everything*, which requires an energy in the order of 10^{19} GeV (*Plank energy*) and an accelerator larger than the solar system. It is absolutely impossible.**

.The reason for the failure is that general relativity is incompatible with quantum mechanics because it is not renormalizable.

Recently, we have developed a theory of unification of the gravitational and electromagnetic forces without resorting to general relativity and quantum field theory.

The theory predicts that the gravitational wave propagates with the same speed of light.

New discovery:
Wang's Law

The total linear momentum of the gravitational field propagated into space is conserved

- **The failure of the mainstream to unify the gravitational force reviles many fundamental problems of the standard doctrine of the theoretical physics .**
- **The first problem is that the approach of the theoretical physics of 20th century to the understanding of microscopic world is wrong**

- **Instead of studying the structure of radioactive nuclides, the theorists of the 20^{th} century were engaged in the study of the structure of nucleons.**
- **The right approach to the microscopic world is the study of over 2000 nuclear isotopes, which will show some regularities even periodicity that would be suggestive of the nuclear structure.**

- **A systematic study of the nuclear isotopes will not only lead us to the understanding of the nuclear structure, but also highly possible to the discovery of new nuclear fuels and realize controlled thermonuclear fusion.**

- **Whichever country who first takes this new approach would be the first to jump out of the abyss and emerge as the world leader in science and technology.**

The second problem with the microscopic physics:

it is impossible to understand the microscopic world through collisional experiments

According to quantum theory:

$$\frac{d\sigma}{d\Omega} = \int \Psi^{\dagger} V(\mathbf{r}) \Psi d^3\mathbf{r}$$

The left side of the equation is the experimentally measurable differential cross section, and the right side is the theoretically calculated value by integration.

Our job is to determine the integrand (wave function and the interaction potential) based on the value of the definite integration (the differential cross section).

But this is an impossible job!

For example, the mass of a solid can be calculated by integration if the mass density and the shape of the solid is given:

$$m = \int \rho(\mathbf{r}) d^3\mathbf{r}$$

But the opposite is impossible: No one can determine the mass distribution and the shape of the solid given the mass!

Namely, no one can determine the integrand and the boundary given the value of a definite integration!

To determine the interaction Lagrangian and the wave function based on cross section measurements is fundamentally speculative and highly impossible.

To make the speculative job a little easier, some restrictions are imposed on the forms of the wave functions and interaction potentials (Lagrangians), in the name of "symmetry", "mathematical beauty".

The early concept of symmetry included CPT conservation. The more general concept of "symmetry" means the theory remains invariant under certain transformation.

The most important symmetries are the Lorentz invariance and the gauge invariance. The Standard Model of particle physics is built upon the Gauge Field Theory.

The gauge field theory does not allow any particle to carry mass. It was then hypothesized that there exists an omnipresent God particle that allows other particles to obtain masses through "symmetry breaking".

A philosophical question : Is the Nature fundamentally symmetrical or asymmetrical?

If the Nature is fundamentally symmetrical, why do all particles have to obtain masses through symmetry breaking?

If the Nature is fundamentally asymmetrical, why should symmetry be imposed upon a theory in the first place?

Logically, the action of obtaining mass should not take longer than the lifetime of God particle . It is like "the first push" by a God particle.

Newton's "first push" does not need a term of "God" in his law of gravitation.

But the "God particle" has to coexist with proton and electron all the time in the same Lagrangian of the Standard model, although there is a world difference between the lifetimes of the God particle and proton.

The God particle and proton and electron cannot be coexistent all the time.

Another serious Problem: The elementary particles are no longer elementary

There are hundreds species of animals in the *particle zoo* .

There is no control of the ever expanding size of the zoo!

The reason for *Gel-Mann* and *Zweig* to propose the quark model was to reduce the number of species of the elementary particles.

With the standard quark model, the number "elementary particles" has reduced to 61, not including the various non-orthodox particles.

<u>This number is still too large for the particles to be "elementary".</u>

(36 quarks and antiquarks, 12 leptons and antileptons, 8 gluons, 3 vector bosons, photon and graviton)

The reason for the explosion of number of elementary particles was the identification of the resonances and excited states as particles based on Einstein's mass-energy equivalence.

The resonances are the peaks in the plots of cross section spectra, not really particles.

The resonances are not particles

I have shown that mass and energy are not equivalent in one of my publications:

A Critique on Einstein's Mass-energy Relationship and Heisenberg's Uncertainty Principle

***Physics Essays*, Vol. 30 No. 1, 2017.**

The resonances are not particles

The whole business of the particle physics in the last 70 years was the classification and categorization of the particle zoo largely occupied by the resonances

If the resonances are not particles, the 70 years of particle physics would be a great joke.

Shift of Paradigm

There is a dramatic shift of paradigm in the theoretical physics of 20th century in:

fundamental postulations

methodology

logic

experimental verification

sense of mission

philosophy

Shift of Paradigm

The classical space and time are mutually independent, and independent on velocity and observer. The space and time are infinite. The time is one-directional.

In modern theoretical physics, space and time are mutually dependent, and dependent on velocity and observer.

The space and time may be finite;

Time can go back to the past.

Shift of Paradigm

In classical physics, mass and charge are fundamental quantities. Charge and mass of a particle are constants. Mass is a measure of quantity of the substance, inertia, and its gravitating strength. Energy is a measure of movement or state. Energy is essentially different quantity from mass.

In theoretical physics of 20^{th} century, mass of an object is dependent on velocity, but charge is invariant constant. All particles must obtain masses through God particle, but charge does not need to be obtained through any such mechanism.

Shift of Paradigm

In classical physics, the mass conservation law, the momentum conservation law and the energy conservation law cannot be violated, Mass and energy cannot be created nor destroyed, creationism is a direct antithesis to science.

In theoretical physics of 20^{th} century, the mass conservation law, the momentum conservation law and the energy conservation law have all been violated. Creation and annihilation of particles are stipulated in the standard procedure of quantum field theory.

In the *quantum bubble theory*, Steven Hawking claimed that in a tiny volume of 1 cc. there were 10^{143} baby universes created per second, all connected to our universe through wormholes.

Shift of Paradigm

Classical physics holds some logic inviolable. For example:

*** Part of an object is always less than the whole.**

*** Causality is inviolable.**

In theoretical physics of 20^{th} century no logic is inviolable.

Violation of causality has become a favorite, fashionable and fascinating idea for si-fi movies.

The mass of a particle can be less than the mass of the parts making up the particle. For example, the massless photon is assumed to be a linear combination of massive particles B^0 and W^0 in the Standard Model.

Shift of scientific mission

The classical mission of physics is to promote the progress of human civilization, to provide theoretical tools for scientists and engineers in their applications. Application of fundamental science is the ultimate test of the theory.

The mission of modern theoretical physics has shifted to finding a Theory of Everything, building a Babel tower and understanding God's mind.

Shift of scientific mission

Theoretical physics has become an isolated and closed club having nothing to do with any other branch of science, including nuclear physics which was the hometown of particle physics.

Many "breakthroughs" have been claimed over the last decades, but the rest of science remains unaffected.

Shift of Epistemology

The classical physics believes that the Nature can be learned through experimental investigation logical reasoning and mathematical analysis.

The theoretical physicists of 20th century believes that some laws of nature can only be studies by theorists on their scratch paper, such as the "phenomena" in other universes, in the higher dimensions, before the Big Bang or after the Big Crunch.

Shift of Epistemology

The classical physics believes that science will advance indefinitely with deeper and deeper understanding of natural laws, but will never exhaust the laws of Nature. There is no "Final theory of everything".

The orthodox physicists of 20th century believe that they will find a "Final theory of Everything" very soon, may be at the end of 20th century (Hawking) or a little latter.

Shift of Ontology

There are broad and deep discrepancies in almost all aspects of ontology between the classical physics and the theoretical physics of 20th century:

. What is the definition of a "particle"?

. What is the wave function?

. Why are physical quantities mathematical operators?

. What is the particle-wave duality?

Shift of Ontology

. What is isospin?

. What is hypercharge?

. What are the flavors and colors of the quarks?

. Why is the zero-mass photon a combination of massive particles of B and W?

. The original calculation of the mass and charge of electron diverge. It becomes finite after subtraction of an infinity from the original infinity.

Why is the infinity unobservable while the finite residue observable?

Shift of Science

In 17th century, history has witnessed a shift of paradigm from Ptolemy's geocentric astronomy to Copernicus' heliocentric astronomy, from medieval theology and mythology to scientific pursuit of knowledge by experimental investigation, logical reasoning and mathematical analysis.

Shift of Science

In 20th century, history witnessed a shift of paradigm from science back to the medieval theology and mythology, from scientific cosmology to Big Bang cosmology, from conservation of mass and energy to mathematical creationism with particle creation and annihilation as standard procedure, from evaluation of theory by experimental evidences to evaluation by mathematical aesthetics.

Shift of Science

The theoretical physics has reduced from fundamental science that provides theoretical tools for science and engineering to an enterprise having nothing to do with science and society.

Shift of Science

As a result of disengagement of theoretical physics from reality, the private sector of research funding for theoretical physics has practically reduced to nothing. The governmental support is also reduced, or failed to catch up with the theorists' ambition.

The job market for physics students are greatly reduced, so are the enrollments of physics majors.

Shift of Science

SSC of USA was terminated in Clinton Administration;

Russians have lost their interest in particle physics and cosmology long before that.

Now some internationally renowned physicists are trying to talk Chinese into building a great collider bigger than LHC.

Shift of Science

More important than money is the mental health of the young children, who are brain washed in classrooms since elementary school, and further educated by si-fi movies and TV shows with fascinating stories:

Big Bang;

Star trek;

Time travel and time machine;

Black holes, white holes, worm holes;

Multiverse;

High dimensions;

……

Shift of Science

To physics students, theoretical physics is not about finding truth from observation of the physical world, but about playing with mathematics and proposing hypotheses.

They generally believe in *creatio ex nihilo*, and have lost their confidence in conservation of mass, energy and momentum;

These are the future work force to perpetuate the currently prevailing mythological physics.

Shift of Science

The dominance of mythological ideology in the name of academic freedom has actually eliminated the academic freedom, suffocating the normal advancement of physical science.

The critics against the main steam doctrine are not accepted by the major physics journals, and are not properly funded.

It is suicidal to voice your critique in a society of "publish or perish".

Shift of Science

The philosophers are expelled from academic discussion of ontology and epistemology in theoretical physics: "Shut up and calculate!"

But the exact reason for the theoretical physics to run into a dead end is the shift from scientific philosophy to mythological philosophy.

So philosophers, we need your help!

Physics needs nothing less than a new Renaissance!

It is the destiny and historical mission of our generation to stop the mythological and theological infiltration and interference into science, and rescue physical science from a mathematical abyss, pulling physics back onto the scientific track paved by Renaissance pioneers and martyrs, for the future of science, and the future of our children and grand children.

Conclusion

The Emperor's old clothes are prettier, and more effective in identifying the competent from those who are not!

Ling Jun Wang

Lingjun-wang@utc.edu

Related references

1. Ling Jun Wang, "Unification of Gravitational and Electromagnetic Fields", *Physics Essays,* Vol. 31 No. 1, 2018.
2. Ling Jun Wang, "A Critique on Einstein's Mass-energy Relationship and Heisenberg's Uncertainty Principle", *Physics Essays,* Vol. 30 No. 1, 2017.
3. Ling Jun Wang, "One Hundred Years of General Relativity – a Critical View", *Physics Essays,* Vol. 28 No. 4， 2015.
4. New book by Ling Jun Wang: *Unification of Gravitational and Electromagnetic Fields,* Scholars' Press, copyright 2019. ISBN 978-3-639-51331-8

The Book

by Ling Jun Wang

Unification of Gravitational and Electromagnetic Fields

Scholars' Press, copyright 2019.

ISBN 978-3-639-51331-8

Available on Morebooks.com