Quantum Considerations

{ PREDMET 4 Mg
{ 6 Tabs

" Conciliate "

Dancing Wu Li Masters (Zukav)

Wu Li = Patterns of organic Energy.
Wu Li Master does not teach. but the Student learns.

- Mathematics is a highly structured way of thinking.
- Do physicists impose this mathematical structure on that they see? or
- the world presents itself most completely through this structure?
- Mathematics and English are both languages. Languages are useful tools for conveying information. but if we try to Communicate experience with them, they do not work. All a language can do is to talk about experience Description of an experience is Not Experience.
- A book on physics cannot contain the experience itself. The book gives a description. The experience comes from you.

- Quantum Mechanics includes Newtonian Mechanics as a special case. Newtonian physics does not work in the realm of small

- Newton:

"... I have not been able to discover the cause of those properties of gravity from phenomena and I frame no hypothesis (hypotheses non fingo)

-- Newton's letter to Bentley:

"... that one body may act on another at a distance through a vacuum without mediation of anything else, by and through which their action and force may be conveyed from one to another, is to me so great an absurdity that, I believe, no man who has in philosophic matters a complete faculty of thinking could ever fall into it"

- Action at a distance can be described. but cannot be explained

Participatory Universe - John Wheeler

" May the universe in some strange sense be "brought into being" by the participation of those who participate ? ...
The vital act is the act of participation.
"Participator" is the incontrovertible new concept given by quantum mechanics. It strikes down the term "observer" of classical theory, the man who stands safely behind the thick glass wall and watches what goes on without taking part. It cannot be done, quantum mechanics says "

- The languages of Eastern mystics and Western physicists are becoming similar.

- Subatomic particles seem to know instantaneously what decisions are made elsewhere and elsewhere can be as far away as another galaxy.

- Something is organic if it has the ability to process information and to act accordingly.

The wave function (ψ).

The wave function represents, strictly speaking an observed quantum mechanical experiment. It describes physical reality at the most fundamental level.

According to Q.M. the wave function is a complete description of physical reality at that level.

- Description of a substructure underlying experience more complete than the wave function is not possible
- That which the wave function describes is both matter-like and idea-like, ∴ physical reality is neither both - matter like and idea like.
- Stapp: The physical world appears to be completely substantive (made of "stuff"). Nonetheless if it has an idea-like aspect, the physical world is Not substantive in the usual sense - 100% matter and 0% idea.
- This does not mean that the world is completely idea like.
- Copenhagen interpretation →
  "what we perceive to be physical reality is actually our cognitive construction of it"

- The key to the understanding of the Universe is You
- The distinction 'in-here' 'out-there' may not exist. What is 'out-there' apparently depends in a rigorous mathematical sense as well as philosophical one, upon what we decide ~~here~~ in-here.
- The observer cannot observe without altering what he sees. Observer and observed are related in a fundamental sense.
- What we experience is not external reality, but our interaction with it.
- Heisenberg: "What we observe is not nature itself, but nature exposed to our method of questioning"

⊙ Nonsense is nonsense only when we have not yet found the point of view from which it makes sense" This is exactly what a creative scientist does.

- The Special theory of Relativity is not a theory that everything is relative. It is a theory that appearances are relative.
- It is a theory not about that is relative, but about that is absolute.
- The speed of light just happens to be the most nonsensical thing ever discovered. It never changes.
- The Puzzle of the constancy of the velocity of light became the Principle of the Constancy of the Velocity of light - This is the first foundation of the Special theory of light. This conflicts with Common Sense. According to Einstein Common Sense must be wrong.
- All laws of nature are the same in all frames of Reference moving uniformly Relative to each other

- EAST: Notion of Illusion.
  Illusion is NOT in the sense that it does not EXIST.
  BUT in the sense we do not see it as it really is.
- Dancing Energy and Transient Forms.
  (This surprisingly is the view of matter according to High Energy physics)

- Einstein discovered that laws of geometry are valid only in limited regions of space and are not universal.
- There is no way to distinguish between uniform accelerated motion and a constant gravitational field. [Gravity ≡ Acceleration]
- Inertial mass = Gravitational mass.
- According to Einstein, the earth's orbit is simply the easiest path for the earth to take as it moves through space-time continuum warped as it is in the neighbourhood of the Sun.

- According to Einstein, a piece of matter is a Curvature of Space-time Continuum.

There are no such things as "gravitational fields" and "masses" - They are only mental Creations. No such things exist in the real world. There is no such thing as "gravity" - gravity is equivalent of an acceleration, which is motion.

- Energy = Mass = Space-time Curvature
- "What we Considered to be a planet with its own gravitational field moving around the Sun in an orbit Created by the gravitational attraction (force) of the Sun is actually a pronounced Curvature of Space-time Continuum finding its easiest path through Space-Time Continuum in the vicinity of a very pronounced Curvature of the Space-time Continuum"

There is nothing but Space-time and motion and they in effect are the same thing

Particles Quantum aspects. - Spin.

"The angular momentum of a subatomic particle is fixed, definite and known. "But" wrote Max Born one should not imagine that there is anything in the nature of matter actually rotating."

—

Interpretations From (Quantum Reality)

Copenhagenists believe that when an electron is not being measured, it has no definite dynamic attributes.

The quantum world is objective, but objectless (example: Rainbow)

An electron's attributes do not belong to the electron itself, but are a kind of illusion produced by electron plus the entire experimental arrangement.

Bohr, Heisenberg: Their theoretical structure did not extend down and anchor itself on fundamental microscopic Space-Time realities. Instead it turned back and anchored itself

in the Concrete Sense Realities that form the basis of Social Life."

Stapp

(2) Observer based Reality: Observer-Created Reality physicists (Wheeler) do believe that dynamic attributes - position and momentum for instance - do not exist until they are observed Electrons certainly exist - with the same mass and charge whether you look or not. - but it is a mistake to imagine them in particular location or traveling in a particular direction unless you happen to see one doing so.

(David Bohm)

(3) Reality is Undivided Wholeness.

Despite obvious Separation, the World is a Seamless Whole (Entire Expital Arrangement of Both includes the Universe itself)

phase entanglement.

Quantum Waves are in Configuration Space (3 dimensions for each particle)

- Single wave in a multidimensional space. an action on A has instantaneous effect on B, however far it is.

- Heisenberg:
  - Wave function does not represent a real situation, but our knowledge of a physical situation.
  - Wave function collapse is not an actual physical event, but represents the change that occurs in our knowledge when we become aware of the result of the measurement.

- Difference between Correlation and Connection

If a friend in Texas seals a silver coin in one envelope and a gold coin in another and mails the envelopes to Tokyo and London, the instant you open your envelope in Japan, you know the contents of ~~my~~ the envelope in London. But opening your envelope causes no physical change in ~~your knowledge concerning~~ ~~something~~ England / Is this correct.? This does not work for Quantum Correlation. Aspects Exp ?

Mathematical phase entanglement is different from classical kind, the knowledge that we gain in quantum measurement is of a different kind from the knowledge that we gain from opening an envelope.
Perhaps we cannot so easily dismiss the reality of the instant connectness by appealing to ordinary knowledge models such as Cornelia and Coins.

- Bell's discovery - quantum correlations are so strong - extremely drastic models of reality must be involved. - models that necessitate the real existence of a pervasive and powerful long range connectedness

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Multiple Universes : Everett's model.
(No collapse.) - everything that can happen actually happens.
In Everett's bountiful multiuniverse, every little "could be" no matter how improbable, gets live to strive
Stable
(Helps biological evolution!)

Neo-Realism: believe "atoms" are things.
This does not hold - Heisenberg, Bohr, .. Neumann →
"Whatever atoms may be, they cannot be ordinary objects"

=

Instant connections are no accident, but necessary feature of any object-based model of reality and many other models of reality as Leu-Bell's Theorem.

Consciousness Creates Reality:
(First Suggested by Neumann.)
→ the world is not objectively real, but depends on the mind of the observer.

the only physical link in the von Neumann chain is the link between the observer's brain and the observer's mind.
Here where the mystery of matter gives way to mystery of mind, is the privileged position for the elusive quantum jump.
All those entities which compose the mighty frame of the world exist without the intervention of the mind. Only dynamic attributes are mind created.

The dilemma:

Since most of reality most of the time dwells in the unmeasured condition, which quantum theory represents by an uncollapsed superposition of possibilities, the lack of such a description leaves the majority of the universe (everything that is not currently being measured) in a shroud of mystery.

- deep reality symbolized by Ψ -

Wavewise superposition of possibilities } $\Psi \rightarrow$ Experienced actualities.

↳

Heisenberg's Potentia.

"The atoms or elementary particles themselves are not as real; they form a world of potentialities or possibilities rather than one of things or facts".

- The Sole Supporter of everything Lr See around us
- The Mighty frame of the World (Berkeley)

(no more substantial than a phantom)

Quantum Reality (Collapse)

- Bohr. Uncertainity Principle. quons do not possess dynamic attributes. - these reside in the relation between the entity and the classical measuring device.
- Observer decides the attributes (wave/particle etc)
- The world is an undivided wholeness.
- Phase entanglement - real physical interconnectedness that instantly joins every quon to every other.
- Multiple Universes - no collapses. - everything possible.
- A new form of logic - wave-logic. (Non-Boolean). incompatible attributes. - perfectly natural.
- Neorealists - every experiment must be described in classical language. ∴ reality also is ordinary - classical.
- Consciousness Creates Reality - collapse is due to Consciousness. ∴ in the mind

Bell's theorem: Reality must be non-local.

non-local = unmediated action-at-a-distance.

action here — effect there.

Non-Local Interaction is { unmediated, unmitigated (space), immediate. (time)

Bell: The world is filled with innumerable non-local influences. Furthermore these unmediated connections are present not only in rare and exotic circumstances, but underlie all the events of everyday life. Non-local connections are ubiquitous because reality itself is NON-LOCAL.

- We can perceive the world only through the "human filter" (Kant!)
- The concept of classical language, we use to describe and state results. — general human way of thinking.
- Quantum reality is not "classical" — presents simultaneous possibilities.

Consciousness: Is Consciousness a quantum effect?

- Can we discover an explicit relationship between waveform alphabets of quantum theory and certain human states of consciousness?
- Bell's theorem shows that although the world phenomena seem strictly local, the reality beneath this phenomenal surface must be super luminal.
- The world's deep reality is maintained by an invisible quantum connection whose ubiquitous influence is unmediated, unmitigated and immediate.

Einstein:

"A human being is part of the whole called by us "the universe", a part limited in space and time. He experiences himself, his thoughts and feelings as something separated from the rest – a kind of optical delusion of his consciousness. This delusion is a kind of prison for us, restricting us to our personal desires, and to affection for a few persons nearest to us.

Our task must be to free ourselves from this prison by widening our circle of compassion to embrace all living creatures and the whole of nature in its beauty. Nobody is able to achieve this completely by striving for such achievements is, in itself, a part of the liberation and foundation of inner security"

Hierarchy in Science

While in terms of achievements and applications there is perhaps no real hierarchy in Science, when it comes to a question of basic explanations a hierarchy is inevitable. Biology depends on Chemistry and Chemistry on physics and in physics itself one goes from gross to finer explanations. While this approach naturally became a reductionistic approach, surprisingly it has turned out that this pursuit in ~~terms of~~ far and more basic constituents has itself led to the recognition of a holistic substratum behind all forces and particles. This has also transformed our ideas of the basic framework — namely space-time and causality within which to seek all such explanations. — The distinction between matter life and consciousness also disappears at the most fundamental levels.

17/4/98

- In the ultimate analysis according to modern physics (Quantum Mechanics, Relativity and Elementary Particle physics, Relativistic Quantum Field Theory) the world ~~is a dynamic structure of the four dimen~~ (Matter, Radiation, Forces) is a dynamic structure of the four dimensional Space-time Continuum (Quantum Mechanical vacuum), which in parts may appear as static for over certain time and Space Scales.