

The Light Cone

**Philip
Franses**



Introduction

Taking with us a holistic thread, we follow the pursuit of knowledge into the labyrinth of an ever-deepening logic; there we meet mankind lost and sacrificed to the attempt to erect a final foundation of atomic origin; deposing this central tenet, we follow the thread out into light of a science liberated into the natural realm.

The Age of Enlightenment

Throughout the history of physics, the way the relationship of individual to world was interpreted, determined how mathematics was turned into the world picture of physics. Newton and Leibniz, late 17th century, with the same mathematics of the calculus came to opposing world pictures through the different basis of relationship of individual to world. Both imagined they had stumbled upon an absolute world-description: Newton of mechanics; Leibniz of the wholeness of monads.

For Newton:

calculus applied to the inert bodies of matter and described how forces interacted with bodies essentially resistant to change;

the world would like to be at rest and has to be wrought out of that state by forces implying change.

For Leibniz,

calculus applied to the innate capacity for change and described how interactions between participants, brought about the monad, the wholeness of being transcendent over change; the world was in change, seeking completion, to come to rest in the monad.

This basic principle of how change leads to stability can be interpreted in two ways. In interpreting the world through the elemental notions of secure fundamentals, such as atoms and genes, one will see the higher level structure of castles and organisms defined in relation to their lower level parts. However in seeing the world as an innate potential to realize the higher, then the dynamic of participation will take one up into the monads (identities), defined in self-relation as intrinsic wholes.

The relation individual to world recognizes a thing in part-relation to other things and a soul in whole-relation to itself through the same mathematics. There is simply the twist that the wholeness of soul is a self-relation, while the definition of things is through a relation to their component parts. Soul goes through the universal to establish itself in self-relation as whole; thing is itself locally through the parts that define it.

Thus we should expect with this key to turn the exploration of change either into a thing-physics or a soul-physics; that we should find the choice of interpretation be present at every stage of theory; and that physics shall go forward by recognizing and relating these two ways of seeing.

Light

The description of light was given extraordinary beautiful form by Maxwell's 1876 equations of electromagnetism. A propensity for ordering the phenomena as magnetism flows into the propensity for ordering phenomena as electricity in an alternating wave that relies on no actual material intervention. The wave of alternation, between two types of organization: electrical field and magnetic field, only interacts with matter when transmitted or received by a moving charge. It relies on nothing but itself.

Thus starlight reaches us from a distant star billions of light years away with all its information in tact! Or a telephone signal reaches the receiver despite the terrain it crossed over in between. In fact for light there is no separation, there are only the two events: transmission and reception and its own nature in between.

The main solution of Maxwell's four-lined change-equations, encapsulating the totality of electromagnetic phenomena, is of a retarded wave^[1]. Even though there are no material parts to its propagation, the wave is finite in speed, thus allowing light to be experienced as part of the world that physics explores.

In 1905 Einstein brought out exactly this last point in the theory of relativity; light is part of the world of experience giving to the observer his own framework of space and time measure. The experience of light gives to every observer the practical opportunity to construct his space-time framework uniquely and differently. This is expressed in the light-cone, which embeds events into a space and time geometry combined (space-time) where light determines for the observer the characteristic of the world's manifestation.

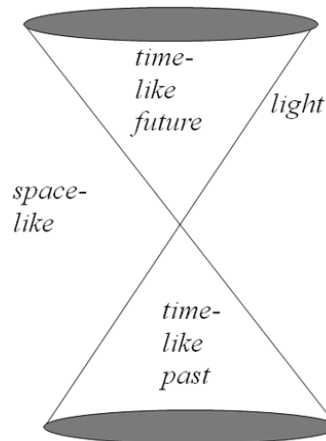


Fig. 1 The Light cone

The physical world is determined by the finite quality of light that both seeds our view of the world and is part of the living structure that we see. The finite speed of light decides that any physical theory is going to be an interpretation of a relation individual to world: one has to meet with light to then know light as part of the finite world one is locally investigating.

Hidden from time

As with all science, there was a catch in this simple explanatory model. If

- 1) light is the holistic thread that tells us how the reductive world of space-time operates and
- 2) light with its finite speed is part of the space-time landscape, then
- 3) what is the nature of the interior darkness which light is prevented from illuminating?

In 1915 Einstein found a unique equation for encapsulating the dynamic of space, time and matter: space-time tells matter how to move and matter tells space-time how to curve. Einstein equations gave natural place to gravity as the universal adjustment resolving different local space time orders. However since the space-time geometry was based on light, and since light was itself redirected by the curving of space-time, there was a limit to the intimate distance to an object that light could penetrate.

The gravitational equations as first solved by Schwarzschild showed that passing a threshold of closeness to a large mass, the relation of matter to curving of space-time - runs out of control! The fall brings more mass and more mass bends space-time ever increasingly!

The light cone no longer points forward into time, but topples over sideways to point into space. Since this means no light can escape, this region is known as a black hole: the time-like is taken over by the forces of attraction towards the object, which inevitably lead to the singularity where space-time disappears, at the centre.

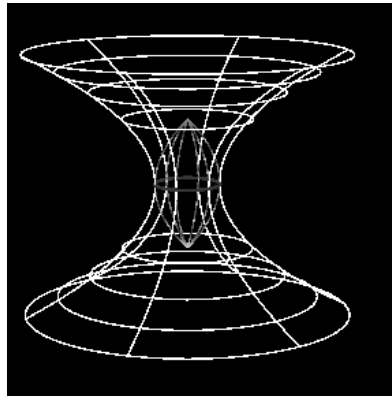


Fig. 2 Diagram of the Schwarzschild wormhole geometry, with white and black holes

As astrophysics professor Andrew Hamilton describes 'The Schwarzschild metric admits negative square root as well as positive square root solutions for the geometry. The complete Schwarzschild geometry consists of a black hole, a white hole, and two Universes connected at their horizons by a wormhole. The negative square root solution inside the horizon represents a white hole. A white hole is a black hole running backwards in time. Just as black holes swallow things irretrievably, so also do white holes spit them out. White holes cannot exist, since they violate the second law of thermodynamics.'^[2]

This is our first encounter with the labyrinth where an explanation appearing to work beautifully in describing the world, crosses a horizon into a realm where single-dimensioned causality breaks down and reason is unable to take us forward.

Instead to penetrate into the world of the very small, a whole new science was developed called quantum theory.

Destruction-creation

The significance of the light horizons more generally is that they mark a shaping influence which plays back upon the character of the present; the horizon is at a distance where events authoritatively focus on the singularity from past or future

In the approach to the present from a linear causal perspective, all notions of space and time inevitably collapse from description of the centre; to discover the present, one has to have a platform of necessary contribution and consequence extending back from the future or forward from the past.

In quantum theory this was achieved by describing every particle through a wave function of probability that predicts its contribution to any act of measurement. The present is described between past contribution and future influence. Science it was claimed had reached the centre of its understanding by a mathematical formulation that accounted for the individual occurrence as a statistical inclusion.

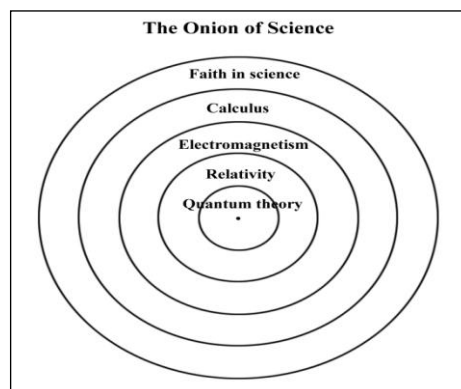


Fig. 3 The Onion of Science, working inward to the point of explanation

The claim to have found the centre was in the most terrible way possible refuted, when Bohr, Danish/ Jewish and Heisenberg, German/ occupier, met in Copenhagen in 1942 with the threat of nuclear destruction as the backdrop. The nucleus that during their journey of discovery had seemed the safe haven to which scientists were travelling cruelly split leaving the originators of the theory as protagonists on either side of a divide each bent on destruction. The onion split apart into two halves, the journey of science was suddenly going outward to the very edge of destruction from which the only place to safety was the jump to the other half of Creation.

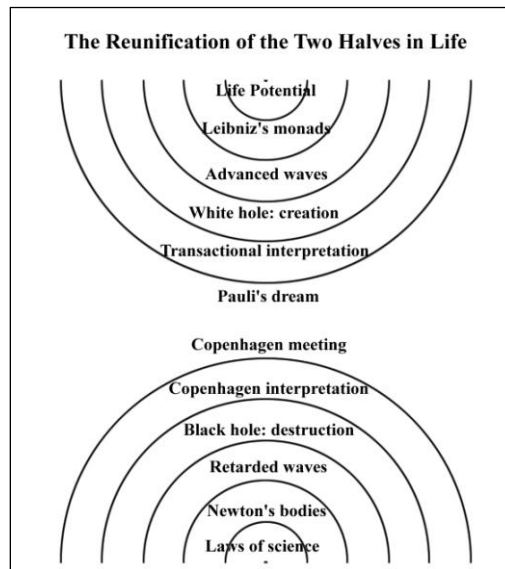


Fig. 4 The two resulting halves reunify in a dialogue between law and life

Quality of time

To travel into this new area of destruction-creation we need to ask new questions of science: What is the completion that relates awareness to itself wholly?

Seeing involves a participatory leap between wholeness as absence and wholeness as creation. A new light cone joins the horizons where the world knows itself as wholly removed, to discover itself anew as wholly present.

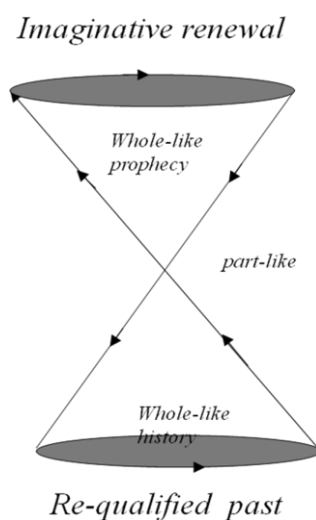


Fig. 5 The Light Cone of Whole and Part

In crossing the boundary of absence, identity reacquaints with wholeness at the horizon of manifestation.

In asking the inner question, the journey of individuation marks the coming together of two sides of wholeness with unique arrival.

Light stands between the conditionality of connections of possibilities exploring a mutual involvement and the actuality of a single outcome that proves the aggregation as viable existence.

Science is hereby transformed from dealing only with the exchange of information from systems actually present, to inferring connection between the future potential and past arising of systems each manifesting a common capacity. Such systems cross the threshold of future and past to make new connection arbitrarily and uniquely, in a singly proved line of logic specific to one actualisation of archetypal potential.

Archetypal resolution

Pauli saw that Einstein world of space-time separation always falls short of arriving at a complete description; *'The new theory of wave mechanics was perfected in 1927... Einstein was not fully satisfied with the solution... I remarked to Bohr at the time that Einstein was regarding as an imperfection of wave mechanics within physics what in fact was an imperfection of physics within life... Today I know that this is the pair of opposites completeness versus objectivity and that despite Einstein's claim it is not possible to have both at the same time.'*

A new science was explored by Pauli in analysis of his dreams:

'Among others [1934], I had the following dream that preoccupied me for years "A man resembling Einstein is drawing a figure on a board. This was apparently connected with the controversy described and seemed to contain a sort of response to it from the unconscious. It showed me quantum mechanics and so-called official physics in general as a one-dimensional section of a two-dimensional, more meaningful world, the second dimension of which could be only the unconscious and the archetypes."' [3]

Pauli discovered in his dreams the thread that disclosed the basis of awareness to itself. These may be contrasted with classical physics as follows:

Collective participation:

in classical physics, participation in the collective reveals the elementary structure to matter; the fate of the material particle can only be resolved by description within a collective participation;

for Pauli, completion realizes the individual within the collective of consciousness; individuals communicating in the collective converge upon the essential sense of wholeness

Whole representation:

the totality of relationships {individual to world} implies the formulation of quantum theory, in which the world is described too intensely for experience;

the collective symbols of the unconscious embrace {individual to world} relationships in a totalisation of individual experience.

Direction of realization:

each particle contains the totality of the possibility of what can be, so far as it can be observed; quantum theory has been described as the end of physics, everything which can be observed falls within the scope of description;

collective symbols represent the totality of what has been; one can see it as a source of regeneration, everything can begin anew.

There is a second focus to the world, behind the marshalling of an existing order, the inclusion of 'knowing' as an active vital element in the putting together of the eternal pattern as wholly revealed. The world then waits for our 'knowing', as an act that will complete, as a deed that will hold the beauty as value to our presence.

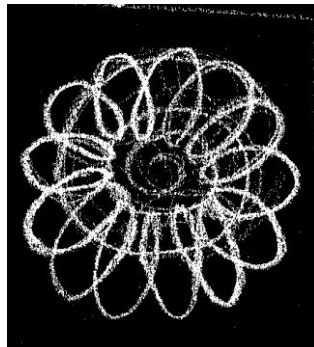
Where do you stand between absence and presence, as inner wholeness comes to light?

References

1. There is also an advanced solution to Maxwell's equation, where a disturbance ahead of time converges upon a destined origin
- 2 Hamilton, A.; 'White Holes and Wormholes' from <http://casa.colorado.edu/~ajsh/schww.html>
- 3 Wolfgang P. (1953; 2001) *Atom and Archetype; The Pauli/ Jung letters 1932-1958*; edited by C.A. Meier Princeton University Press; p. 121-122

Philip Franses is faculty lecturer in Holistic Science at Schumacher College. From his search to the source of science and spirit, there has flowed a series of presentations, workshops, papers. The Process and Pilgrimage forum, which he began in 2009 using elements of Basil Hiley's mathematics of process and Satish Kumar's philosophy of pilgrimage, has broadened into a widely engaged inquiry.

philip@schumachercollege.org.uk



Atom (Deirdre Hyde)