

ON THE FRONTIERS OF MICRO-PHYSICS AND METAPHYSICS

Recent discoveries in sub-atomic physics, are imperceptibly drawing it to similar metaphysical concepts. An Einsteinian physicist, while looking beyond Black Holes, found that matter is so aged and compressed, that nothing escapes from it, not even radiant energy. In the outer reaches of the universe, time does not exist and material is constructed out of non-material. No time, no mass, no dimensionality. This sounds familiar to what the Upaniṣadic seers have been saying about ultimate Reality. Present day science is based on the materialistic view of the universe. But would it be wrong to hold that the universe is spiritual in nature, where there is no mass, and no time, but all is a plenum of spirit ?

Theoretically, this universe is a manifestation of ultimate Reality, as explained by the doctrine of superimposition. Ultimate Reality is spiritual. It is Absolute Experience. It appears as Sat-Existence and Cit-Thought. As Cit, it becomes Cit-śakti, when, by superimposition or Vivarta, it appears as many. Then, the category of number becomes applicable to it. Innumerable selves or quanta of cit-śakti appear at this level.

The concepts of mass and energy appear at this level. They pre-suppose multiplicity. There is no absolute mass or absolute energy. They are relative concepts depending on each other. Energy is spiritual power. This identity of cit and energy is not based on verbal similarity. The motive force or impulse in energy, split up into multiplicity, consists in its drive to Perfection. It has an inner urge to return to the perfect spirituality of the Absolute.

All the energy in the universe possesses this urge. If the intensity of the urge is different in different things, it is a difference of degree only. In so called matter, it is latent. It is latent in the atom and patent in the mind of man. These quanta of spiritual energy have a position but no magnitude. This energy has a free-will. It is derived from the freedom of ultimate Reality. This is the common factor between spiritual units, namely the selves, and particles in micro-physics. It is this common indeterminism that

makes us equate the two. This indeterminism in primary energy is fatal to scientific determinism. Scientific laws are statistical averages. They do not apply in particle physics, that stands between spirit and matter.

When electrical energy begins to evolve because of this inner urge to perfection, it divides into two, the positive and the negative. Not all the particles are charged with electricity, some, like the neutrons are without positive or negative charge. Energy takes various forms. Radiant energy is one such.

In the atom, the proton at the centre is charged with positive energy. The negatively charged particles, the electrons, revolve round it with speed. Some of them jump out of their path at will and change their position. This change in their position is the source of qualitative variety in the universe.

The things in this universe have attributes like magnitude, number, divisibility and velocity. Things have positions out of which arises conceptual space or universal extension. Points have a position but no magnitude. Yet lines arise out of points. They appear as extended in space. This is due to the relative position of atoms in space-time continuum. Spirit is the essence of all things in the universe. Such things have primary qualities. One such quality is mass. It is the essence of matter. It has volume. All space is filled with mass. Space without mass is unthinkable. The weight of things depends on the expansion and contraction of mass. A thing is heavy because its mass is compressed. But mass is related to energy. Their equivalence is shown by the equation $M = EC^2$.

Mass is bound energy. Other energy is free and unbound. But both are ultimately energy. If mass moves at the velocity of light it gets transformed into energy and at that speed time comes to a stand-still. As mass ceases to be mass at one speed of light, energy, automatically ceases to exist, there being no absolute energy, as there is no absolute mass. With the disappearance of mass, there is no space, as space without mass is unthinkable. Time being a component of space-time continuum, also vanishes.

These concepts are reciprocal and mutually dependent on each other. Time and space depend on duality of mass and energy. When this duality ceases, they also cease to exist.

Sub-atomic physics is the link between physics and metaphysics. Laws of physics do not apply to sub-atomic particles. That province is yet to be explored by science. For obtaining further information of neutrons, apparatus has been provided in the satellite recently put up in orbit, by India. At the atomic level, the revolving electrons are never completely drawn to the centre. Similarly two atoms do not completely merge. There is some counteracting force in each atom that prevents it from merging. But fission of the atom releases enormous amount of energy. The release of solar energy and transformation of hydrogen into helium are explained by sub-atomic physics. This process of radiation of energy and contraction of mass is simultaneous and is going on continuously. In this process new chemical elements come into existence.

On the atomic plane the law of uniformity in nature generally prevails. But even here the chain reaction in fission is made possible by one particle lagging behind, when atom is broken. Science can not predict before hand which of the particles will thus lag behind. To this extent, indeterminism prevails.

The upshot of the examination of concepts of mass, energy, space and time made so far shows that they are reciprocal. As there are infinite number of selves but no Absolute self, there are no Absolute mass or Absolute energy, as Absolute energy has no inner urge. Time has also no independent existence as, being a dimension of space, it disappears with the disappearance of space, along with that of mass, as space exists only so long as it is filled with mass.

What is the relation between mass and energy on the one hand and time and space on the other ? Mass and energy are relative to space-time continuum. It is filled with mass and energy as well as the quanta of spiritual energy, viz., selves. Just as there are no Absolute mass and Absolute energy, so also, there are no infinite space and eternal time. Time and space are not like an empty pot, containing mass and energy.

Mass is bound energy. At velocity of light it gets converted into free energy. The principles of conservation of mass and energy bear testimony to each others' existence but are silent on the existence of Absolute mass or Absolute energy. So also time

and space that are relative to mass and energy, collapse when mass and energy cannot be shown to be Absolute.

These concepts of Time and Space and mass and energy are working concepts of science in this finite universe. But they cannot aspire to be Absolute. Ultimate Reality is beyond them and abides for ever in its Perfection as Absolute Experience.

Yet, it is worth-while seeing, how an insubstantial thing like energy contributes to the formation of this universe. The theoretical side of $M = EC^2$ leads to the elimination of mass and energy, when the velocity of mass is equal to that of light. But if this velocity is less than the speed of light, the three dimensional space and time emerge out of space-time continuum. They get split up into two at slower speed. We lead our daily life in this reality of space and time.

According to Einstein, molecular matter in the universe is not capable of attaining the speed of light. The primary quality of such matter is mass. Things with their respective masses co-exist in this universe. These space and time components are the essence of Einstein's space-time continuum. They are not conceptual space and time, which are mathematical constructs. We must descend down from these to the material world. Mass is the essence of matter. It is bound energy. It attains weight in three dimensional space. Weight is dependent on gravitation.

The Absolute transcends space as there is no duality and multiplicity in it. Space is relative and relational. The Absolute Experience is also beyond time as it is beyond relations. Time is subsequent to duality but prior to mind. There is no change or movement in it. There is also no place for position or dimensionality in it. It is beyond the category of number. It is not like a point, having position. Time, space and mass are dependent on duality and number. Where there is duality, one can feel the existence of another, though one can't occupy its place. Perceptual time of each will depend on the intensity of each one's expectation. Each one's time will have a unique length due to this intensity. It will move slow or fast according to the degree of intensity. It will vary from man to man, as it will vary for the same man, according to his moods. Time is measured in terms of space. Thus time and space are relative. Time is the fourth dimension of space, as shown by Einstein.

If the mass of this universe rotates round itself, at the speed of light, without friction, it will be transformed into Energy. Time will then mark time. Energy will cease to be active energy. In the terminology of the Sāṃkhya philosophy it will be in a state of equanimity. In this universe, Energy takes many forms. One such form is that of electricity. The primary form of this energy, that controls the protons and the electrons, manifests itself at very high energies. If at that temperature protons and electrons are bombarded with six different kinds of particles, they react in the same way. This shows that the difference in their character as positive and negative is only apparent, and their underlying energy is the same.

The inverse square law of force does not apply at the sub-atomic level to protons and electrons as it applies to them at the atomic level. Einstein has shown that in gravitation both protons and electrons give identical reaction, though they behave differently in the electro-magnetic field. Gravitation is different from electro-magnetism. It is not equally intensive. In it the attractive force is weak. But it is one kind of energy. A time may come when, both the fields are unified. Einstein has shown that gravitation is a function of space-time continuum when things in it are attracted towards each other, curvature of his continuum keeps them apart. Instead of gravitation increasing, this curvature introduces a steady state.

Gravitation is continuous. It differs from other forms of energy, as it is a negative field of energy. In this expanding universe, as energy is dissipated mass shrinks. It becomes more and more negative, the more energy is taken out of it. In the end by this simultaneous expansion and contraction, the universe reaches a steady state.

Science has as yet not reconciled the different forms of energy. For the present, it has arrived at the steady state of the universe. But this theory may be exploded at any time. In science there is no last word. In metaphysics, Absolute Experience is the first and last word, the alpha and the omega. Scientific theories will go on making asymptotical approach to it. But will science be able to reach the ultimate Reality without transcending its limitations ?

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