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KOMABA, MEGURO-KU, TOKYO 153, JAPAN

Committee six

Discussion paper on Qi and Material

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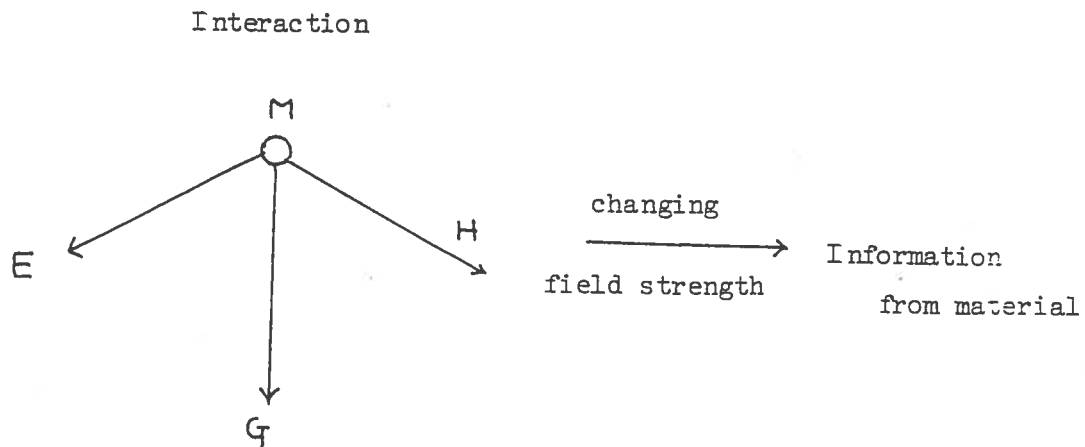
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1. Interaction of Matter and Field

Every thing exists under the influence of the earth's field. Scientists can draw out the informations from matter (or material system) by changing interaction between the matter and three field, such as gravitational, electrical, and magnetic ones. Figure 1 shows these relations schematically.

Usually, material system moves having a velocity v in three dimensional space. And information from the system may change depending on time duration. It is often shown as relaxation of the system. Q_i may be expressed as unified field influence combining three field interaction and time duration.



E: electrical H: Magnetic G: Gravitational

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2. Dual Nature of Particle

Light has both the properties of wave and particle. If light propagates through three dimensional space, it behaves as wave, but it interacts with matter as if it is a discrete particle. These dual characteristics are outside sense of our normal experience. We know the nature of waves and particles individually, but we can not understand both properties simultaneously.

I would like to quote sentences from "Quantum Chemistry" written by H.Eyring and W.Kimball.

The Dual Nature of Light

The essential feature of quantum mechanics is the dualism of all the fundamental particles. At times these particles behave like form of wave motion, at other times they exhibit the ordinary properties of particles.

The dual nature of electrons

It is now known, as a result of the experiments of Davisson and Germer and G.P. Thomson, that diffraction experiments very similar to those on light may be performed with a beam of electrons. These experiments form a brilliant confirmation of the hypothesis, first advanced by deBroglie, and put into mathematical expression by Schrödinger, that electrons, instead of having law of motion similar to the classical laws, actually obeyed the law of wave motion in the same way that photon do.

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3. Interaction of Chemical Species

Atom or ion reacts with the other chemical species to form molecule or compounds.

Atom reacts each other exchanging electrons and form molecule. These type of chemical bond is called covalent bond. The attracting force can be expressed as exchange integral and other ^{by} quantum theory.

Cations and anions are combined by electrostatic force making salts. For example, sodium reacts with chlorine to form sodium ion Na^+ and chloride ion Cl^- , and resulting is sodium chloride. In the case, the chemical bond is called ionic one.

Recently, one has an idea that chemical species can recognize the other one, in other word, remember the others. Polymers such as bio-polymers are these examples. Even if the polymer is resolved into the components, the components react each other to form the original one, if the components are mixed together again.

Chemical scientist consider the fact as followings. One chemical species has some special functional groups which can recognize the position of reaction and join together to form exact the same molecules as before.

How the chemical species remember the partner exactly?

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4. How we can realize the nature of the matter?

As all scientists know, when quantum mechanics was introduced in chemistry, the nature of atom or molecule was elucidated well by the use of quantum chemical method. But we can not clarify the hole nature of the matter and chemical world yet.

It is necessary to clarify material systems by some other method other than statistical or quantum mechanical method. I hope that Qi may solve these problems.