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The Principles of Matter

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The Principles of Matter

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I. Introduction

Matter is the only thing and everything in the Universe.

But matter has been mystified by things like dark matter, dark energy.

There may be something in the Universe that we still do not know, and speculations may be needed for some phenomenon, but models and theories to explain that phenomenon should have firm and scientific ground.

Under the Principles of Matter, matter is simple:

Matter is anything that has mass and energy.

Matter tends to share energy with other matter to form a system of minimum energy formation.

When a strong enough initial energy breaks the formation, a new minimum energy formation begins in the new situation.

Since we are discussing matter and energy, two issues cannot be ignored:

1. The laws of thermodynamics.
2. Gravitation

We will discuss those two topics later, but first the main topic:

II. The Principles of Matter

1. Matter is any substance that has mass and energy.
2. Matter requires a minimum amount of energy (minimum energy requirement).
3. The Law of Minimum Energy Formation: Matter tends to share energy with other matter to form a system of minimum energy formation in its situation (the minimum energy formation).
    1) Matter releases energy when it has more energy than its minimum energy requirement, until it gets to its minimum energy requirement.
    2) Matter shares energy with other matter when its energy gets to its minimum energy requirement (energy sharing).
    3) The extent and result of energy sharing is the minimum energy formation.
    4) To break a minimum energy formation, a strong enough initial energy is needed. Then a new minimum energy formation begins in the new situation. The more energy is shared in a formation, the more initial energy is needed to break the formation.
4. Matter moves because it tends to be the minimum energy formation (the dynamic minimum energy formation), which also defines its moving track (orbit).
5. A system is in the dynamic minimum energy formation when each member's orbit is settled.

For Principle 1, the lightest matter (photon) is almost massless[1]; any matter's energy is always more than 0 (absolute zero in temperature can not be reached[2]).

Two examples:

Like you and me, we are sharing energy with Earth in a minimum energy formation. Changing our position on Earth needs initial energy to break the original formation. Such as walking, every step is breaking the original formation and forming a new minimum energy formation.

Water is sharing energy with Earth. Water going downhill to the ocean is the process of releasing its potential energy. That potential energy is the tendency of energy sharing with the Earth. When the water gets to the ocean, that is where it becomes the minimum energy formation. To break that formation, an initial energy like heat is needed to make the water molecules into vapor (gas), then a new minimum energy formation begins.

Now, let us discuss the laws of thermodynamics.

III. The Laws of Thermodynamics

The Principles of Matter agrees with almost all the laws of thermodynamics, except the third law.

The third law of thermodynamics states that a system's entropy approaches a constant value as the temperature approaches absolute zero[3].

From the Principles of Matter, there is an almost agreement and a disagreement:

- *The disagreement:* The temperature of matter or a system does not approach absolute zero, instead, it approaches its minimum energy requirement, which is always more than absolute zero.

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- *The almost agreement:* A system's entropy approaches a constant value as it approaches the minimum energy formation.

Now, let us discuss the second issue.

IV. Gravitation

After Isaac Newton observed an apple fell from a tree in 1666, he proposed the law of universal gravitation, which states that every particle or body attracts every other particle or body in the universe with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between their centers[4]:

So, Newton attributed the cause of gravitation to the mass of particles or bodies, although he did not know how the force is propagated.

Newton's law was later superseded by Albert Einstein's theory of general relativity[5], in which the cause of gravitation is attributed to curved space-time, which in turn is caused by mass or energy.

The Principles of Matter has a different perspective:

Let us start from the very beginning. Long long time ago, there was a Big Bang…

V. The Formation of our Universe

According to the Big bang model[6], the universe was born from an explosion of a very hot, very dense, single point in space, and caused fast expansion of space, and a large amount of energy release.

As the universe cooled, matter formed, and nuclear fusion began, that is, energy sharing began:

This nuclear fusion is called the proton-proton chain reaction[7], in which four hydrogen nuclei (protons) combine to form one helium nucleus. The simplified steps are:

1. Two hydrogen nuclei combine to form a hydrogen-2 nucleus called deuterium (energy sharing).
2. The hydrogen-2 nucleus captures another proton to form a helium-3 nucleus (energy sharing).
3. Two helium-3 nuclei combine to form one helium-4 nucleus (the minimum energy formation).

Because of the energy sharing process, large amounts of extra energy were released. Most of the extra energy keeps the process going, the rest are released as high-energy photons (gamma rays), which was the first light, and neutrinos.

In that vast space expansion and nuclear fusion, there was a rotating cloud of fusion centers with gas and dust known as the solar nebula. From the force of the Big Bang, it rotated fast so that it flattened into a disk. In the center, the nuclear fusion (energy sharing) was still going on, which caused the minimum energy formation of helium, and pulled most of the material toward the center to form the sun.

On the edge of the disk, some much smaller fusion (energy sharing) centers were also pulling materials toward them that eventually formed the planets, so that most planets have their moons or debris; and in each of their cores, the nuclear fusion is still going on. The earthquakes and volcanoes show their activities.

The pulling force of the nuclear fusion (energy sharing) of the sun is still in effect, although the further the planets, the weaker on them, resulting in the minimum energy formation of the solar system.

The solar system will keep this way, if no initial energy is big enough to break its formation.

Or until the sun depletes its energy so much as to form its own minimum energy formation. By then, the solar system's minimum energy formation will change, because the planets can no longer share as much energy.

So, I propose that:

In the levels of star systems, energy sharing, instead of gravitation, is the force to keep the systems the way they are.

Now, let us look at the mechanics of energy sharing at the level of molecules and atoms.

VI. The Process of Hydrogen Burning into Water

$$2H2 + O2 \rightarrow 2H2O + \text{energy (light and heat)}$$

It is a chemical reaction, but if we look deeper, any chemical reaction is just a physical process.

1. *The Reactants:* The hydrogen (H-H) and oxygen (O=O) molecules.
   1.1. Chemically, a single covalent bond bonds two hydrogen atoms; a double covalent bond bonds two oxygen atoms.
   1.2. Physically, the reactants were originally in the minimum energy formation in their situation; the bonds are just shared energy through shared electrons:
   - Those two hydrogen atoms share energy by sharing the two electrons to be the minimum energy form.
   - Those two oxygen atoms also share energy by sharing two pairs of electrons (4 electrons) to be the minimum energy form.

2. *Ignition and Reaction:*

A small amount of energy (a spark or flame) is needed to break the bonds (shared energy) in the hydrogen and oxygen molecules.

2.1 *Bond Breaking*

2.1.1. Chemically, the ignition energy breaks the H-H bonds in hydrogen molecules, and the O=O bond in the oxygen molecule; and the molecules become individual atoms.

2.1.2. Physically, from the ignition:

- The atoms in the molecules get more energy than their shared energy. They vibrate faster and break the bonds, becoming free atoms.
- The photons that were bonded (sharing energy) with the electrons, also get more energy and become free photons (light).

2.2. *Bond Formation*

2.2.1. Chemically, the individual oxygen atoms and hydrogen atoms form new O-H bonds to create water molecules (H2O): each oxygen atom forms bonds with two hydrogen atoms. The process releases more energy than was needed to break the original bonds, keeping the process going.

2.2.2. Physically, the free hydrogen atoms get the chance to bump into the free oxygen atoms. They form the even less energy union (H-O-H) in the new situation, so that two pairs of the electrons can be shared in the minimum energy formation.

- The extra energy excites more photons, making more light.
- The newly formed molecules move fast in the surroundings, making other molecules move fast, causing more heat.

So, I propose that:

1. In a molecule, the atoms share energy, forming the minimum energy formation.
2. In an atom, the protons, neutrons, and electrons share energy, forming the minimum energy formation.

In the same line of thought, I also assume that protons and neutrons are sharing energy by sharing particles like electrons, photons and neutrinos, to form nuclei. Further research into this area would be exciting and fruitful.

As a conclusion, based on the Principles of Matter, all matter, and all systems (hence the Universe) are going toward the minimum energy formation. The minimum energy formation is the fundamental force and destination of the Universe.

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