Matter: How to count it? And an introduction to quantum different phases of matter

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Today scientists believe that all "particles" also have a "wave nature" (and vice versa). This phenomenon has been verified not only for elementary particles, but also for the elementary particles that exist in compound particles like molecules and even atoms. You can consider light (the photons of the light beams) as a "wave-like energy". This energy is a wave–particle, just containing elementary matter and speed.

We can use Einstein, Planck equations to determine the amount of the energy which make up a sample photon:

$$E_{photon} = \frac{hc}{\lambda_{photon}} \tag{1}$$

$$E_{photon} = \frac{6.626 \times 10^{-34} \times 2.9979 \times 10^{8}}{6 \times 10^{-7}} \tag{2}$$

$$E_{photon} = 3.3106809 \times 10^{-19}\, Joules = 2.066364576990301849\, eV \tag{3}$$

It is the amount of the energy, which a sample photon contains. To date we cannot measure the matter, therefore we make a simple unit that let us to measure the matter. And name this unit a PM.

Each unit of this, is a "point like matter" as small as the amount of the matter which builds a photon boson, and it is (the matter of one photon boson) equal to 1 PM.□

Imagine alike computer pixels they fill and create 3D-objects. Considering K as the kinetic energy, before we begin the related calculations, mind that an infinite amount of tiny particles ($K_{Potential}$) of energy together relatively with an infinite number of energetic waves ($K_{Kinetic}$) form the matter. ($K_{Potential} + K_{Kinetic} = E = mc^2$). Since E gives us the answer for the moment when all

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the matter gets converted into energy as light, there is no difference whether the fusion or the fission process is at nucleic scale or at hadronic scale. However note that the emitted energy via the fusion or fission reaction is made of wave-particles, and it's not only pure energy in the form of waves. $K_{Kinetic} = mc^2 - \infty K_{Potential}$. For now lets follow one of the laws of the classic physics that it describes a photon is just made up by energy, by accepting the Einstein's equation that always $E = mc^2$.

Where Matter is M (or P), the amount of matter for a proton is $\frac{M_{Proton}}{M_{Boson}} = \frac{8.43262991057952\times10^{25}}{2.066364576990301849}$ is approximately equal to $4.080901310678583703347649293942\times 10^{25}\, pm\square$ where we fundamentally suppose that matter is only made up by energy.

Therefore approximately a proton shells the matter 40 septillion times more than a photon boson.

It would be useful to give a name to this amount of the matter, which a proton is holding inside, and call it a PPM.□

Therefore a kppm (kiloprotonpimann) of matter is the amount of the matter, which a thousand of protons are holding inside.

We would use it for quantum tunnels, time travel, and to determine how much an object is more materialized than being in a same phase with the neutralized state of the universal matter. It is the maximum amount of the matter at the neutralized phase with the universal matter (which is in motion) with wave-like properties in space-time and its fields. An alpha particle is not getting considered to be at the neutralized phase with the universal matter, since its too big and it cannot even pass a paper, meanwhile in fact it is the largest particle with wave-like properties. Such issues shall bring a temptation at the blade of science for creation of matter.

One unit of matter is equal to 1 boson; the maximum unit of matter for keep being at the neutralized phase with the universal matter is equal to 1 proton; and $Matter_{Proton} \simeq E$ and $mass_{proton} = \frac{E}{c^2} = 938,272,000\; eV/c^2$, therefore $Matter_{Proton} = 938,272,000\; eV \times c^2 = 8.43262991057952 \times 10^{25}\; eV$. By definition, it is (1 unit of electronvolt) the amount of energy gained (or lost) by the charge of a single electron moving across an electric potential difference of one volt.

Matter, material substance that constitutes the observable universe and, together with energy, forms the basis of all objective phenomena. To date, at the most fundamental level, matter is composed of elementary particles, known as quarks and leptons. In the classical physics observed in everyday life, matter is any substance that has mass and takes up space by having volume. All everyday objects that we can touch are ultimately composed of atoms, which are made up of interacting subatomic particles, and in everyday as well as scientific usage, "matter" generally includes atoms and anything made up of these, and any particles (or combination of particles) that act as if they have both rest mass and volume. Following the discovery of particle detectors, these units (PM, PPM) would be so useful in high energy, and quantum physics.

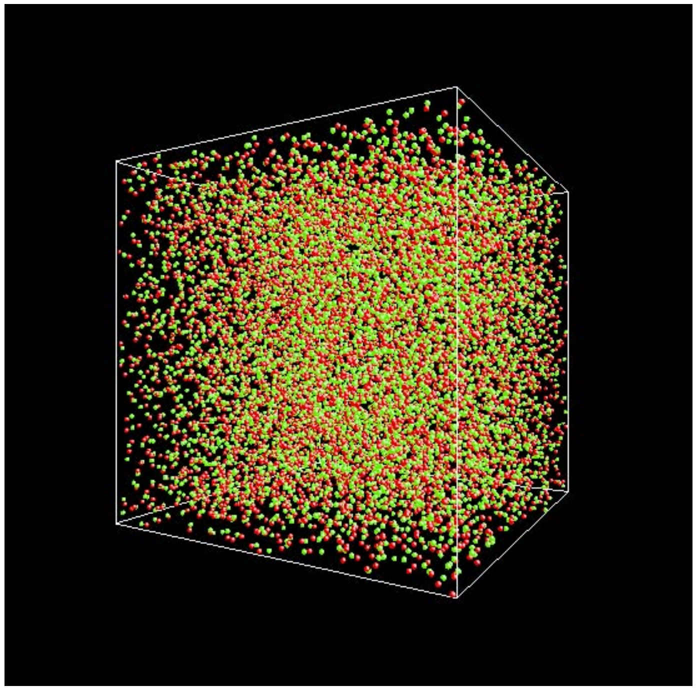

Figure 1: An example of the scalar field for condensed matter

Some examples:

For example the amount of matter for a deuterium atom is equal to$(4.0809 \times 10^{25} + 4.0865 \times 10^{25} + 2.2225 \times 10^{22} = 8.1696225 \times 10^{25}\, pm)$, divide it by the amount of the matter for a proton and we would have the amount of the matter in ppm, which is approximately equal to $2.0019\, ppm$, since it contains a proton $(\frac{M_{Proton}}{M_{Boson}} \simeq 4.0809 \times 10^{25}\, pm \simeq 1\, ppm)$, a neutron $\frac{M_{Neutron}}{M_{Boson}} = \frac{8.44425062448165 \times 10^{25}}{2.066364576990301849} \simeq 4.0865 \times 10^{25} pm \simeq 1.00137 ppm$, and an electron $\frac{M_{Electron}}{M_{Boson}} = \frac{4.59256365351 \times 10^{22}}{2.066364576990301849} \simeq 2.2225 \times 10^{22}\, pm$. The amount of the matter for the electron, which is floating in atomic space, in ppm, is $5.4461819173970874117526687357184 \times 10^{-4} ppm$ or approximately $0.0005446 ppm$. Now if we use the Einstein's mass–energy equation, if we accept the previous assumption that we can consider an energy–particle as an energy quantity, for each atoms of uranium-235 we have $M_{Uranium} = 92\, Proton + 143\, Neutron + 92\, Electron = 235.2460132\, ppm$ and the amount of the recorded energy of fusion experiments of an uranium atom is mentioned as 200 MeV. An alpha particle that cannot even pass a paper contains ~4 ppm matter. An just we demonstrated that an electron that can pass through many objects contains ~0.0005 ppm matter. The other interesting examples are hydrogen, helium, and lead. Hydrogen with 1 Proton and 1 electron, in plasma form (without any electrons), is ideal for creation of proton beam. Helium with 2 proton and 2 neutron and 2 electron is ideal for creation of alpha rays in stadiums in plasma lamps (while it lost its electrons). And lead with 82 protons and 125 neutrons and 82 electrons is ideal to block many of the electromagnetic waves such as X-rays. Working with ppm(s) of matter is much more interesting in physics of condensed matter than working with pm(s). 5 ppm of condensed matter may form an atom, $\frac{1}{5}$ ppm of condensed matter may form a free elementary particle that can easily move inside an atom, and 1 ppm of matter may form a particle at a same phase with the internal elementary particles of the atom.

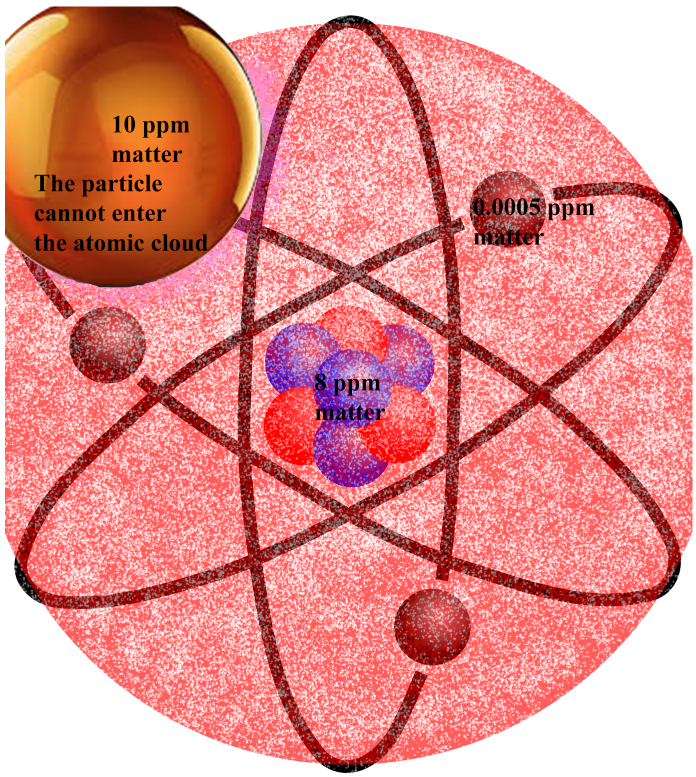

Figure 2: The nucleus filled by i.e. 8 PPM of matter, the physical particle wont be able to pass the internal atomic space since it is filled with 10 ppm of matter, the floating electrons in atomic space are filled with 0.0005446 ppm of matter

References

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[The Universal Matter - NASA, 2017.]