The sources of pure mass and electric charges

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Abstract – This article presents a philosophy about the properties of the electron and proton, in combination with the hypothesis that exclusively and only these two particles form the ultimate building blocks of universe.

Introduction

In daily life we experience mass as the force with which Earth attracts ourselves and the matter around us. The attraction between two masses is generally so small that we don't notice it at all. It is the colossal size of Earth that we actually experience as gravity.

The mass of a proton is generally accepted as $1.7 \cdot 10^{-27}$ kg and its radius as $8.7 \cdot 10^{-16}$ m, resulting in a mass density of $6.2 \cdot 10^{17}$ kg/m³. It is assumed that the electron, with a mass of $9.1 \cdot 10^{-31}$ kg, has that same mass density, leading to a radius of $7.1 \cdot 10^{-17}$ m. This assumption eliminates the 'Electron-Proton Paradox', showing a radius of the electron of $3 \cdot 10^{-15}$ m. The mass of the two particles could be defined as pure mass.

Remark: If Earth had this unimaginably high mass density, all its matter should be compressed in a volume of about 0.01 km³. For example in a cube with a size of about 200 meter.

Mass in modern physics

Thanks to the theories of relativity, the phenomenon 'mass' has also become 'energy' by stating: $m=E/c^2$. This expression leads to the conclusion that *all* masses, created in this way, do have an energy density of $E/m = c^2 = 9 \cdot 10^{16}$ J/kg. That is 1000 times larger than the highest energy density ever observed.
Such a result should be convincing enough to reject the expression $E=mc^2$ definitively.

Philosophical consideration about mass and electric charges

The huge difference between pure mass and normal mass can be explained by Bohr's atomic model, alleged to be composed of electrons and protons, at mutual distances very large relative to their size. So the vast majority of an atom's volume consists unavoidably of vacuum, in combination with particles of pure mass, one with a positive, the other with a negative electric charge.

We cannot give a more detailed description of the unimaginably high mass density, nor of these electric charges, unless we fool ourselves into creating fantasy particles. It is therefore proposed to accept these particles as they appear to us and to regard them as the fundamental building blocks of the universe.

Doing so and ignoring 'masses' created from E/c^2, the atomic mass unit (amu) is defined as *exactly* the mass of a proton plus an electron.

If a neutron would be defined as an electron orbiting a proton at very small radii, even until these radii almost equal the radius of the proton, the kinetic energy of the electron in that most extreme situation is $1.3 \cdot 10^{-13}$ J = 0.78 MeV.
So the energy density of such a ne*w*tron is: $1.3 \cdot 10^{-13}$ J$/1.7 \cdot 10^{-27}$ kg = 77 TJ/kg = 18.4 kT TNT/kg.

According to [1]: "The maximal energy of the beta decay .... has been measured at 0.782±0.013 MeV."
According to [2]: "For every kilogram of uranium-235 that completely fissions, it releases about 17 kT."

The results of these two comparisons therefore support the correctness of both the ne*w*tron and the hypothesis that the electron and the proton are the fundamental building blocks of universe.

References

[1]   https://en.wikipedia.org/wiki/Free_neutron_decay
[2]   https://blog.nuclearsecrecy.com/2013/12/23/kilotons-per-kilogram/