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Short Communication

On the Avogadro Number, Its Relation to Particle Physics

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Avogadro number is very important and remarkable number in physics, it has been discovered by a chemist sciencetist Avogadro. Its definition is very clear.

Avogadro's number, number of units in one mole of any substance (defined as its molecular weight in grams), equal to 6.02214076 × 1023.

But when the definition is read clearly deeply many many times, a relation to particle physics will be seen and understood.

For example, when one mole Hydrogen H^1 is taken into consideration, one mole hydrogen means one gram hydrogen and then one mole hydrogen or one gram hydrogen means that how many protons make one gram. Avogadro number says that for hydrogen, 6.02214076 × 1023 protons make one gram. This means that proton or neutron mass is equal to the inverse of Avogadro number,

$$m_p = m_n = 1.672\ 10^{-27}\ \text{kg} = 1.672\ 10^{-24}\ \text{g}$$

$$= \frac{1}{\text{Avogadro number}} = \frac{1}{6.0221\ 10^{23}}$$

Or m_p X Avogadro number = $1.672\ 10^{-24}$ X $6.0221\ 10^{23}$ = 1.006895

This is the natural result of definition of Avogadro Number. But the ratio of the mass of electron to the mass proton $5.3248\ 10^{-4}$, its contribution to an atom or an element is nearly zero.

When the same logic is applied to He_4^2, one mole He_4^2 means 4 gram He_4^2, 4 grams He_4^2 contains Avogadro numbers He_4^2, how many 2 protons plus 2 neutrons makes 4 grams.