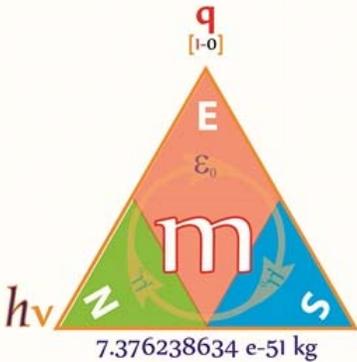


Determining an exact value for Planck's constant

There are a number of theoretical impediments to the accurate determination of a precise value for Planck's constant namely:

- A clear understanding of the role of quantised angular momenta [QAM] in quantum mechanics and how it relates to the geometry of mass-energy at the quantum scales,
- The relationship of equilateral geometries themselves to squared energy levels found throughout QM and how this geometry determines the physical constants and all the mass-energy-velocity relationships
- Along with a knowledge of Matter topologies of all the periodic elements, allotropes and compounds and how quantum mass-energy geometries create these 3D topologies



$7.376238634 \text{ e-}51 \text{ kg}$

Planck's Constant

[quantised mass-angular momenta]

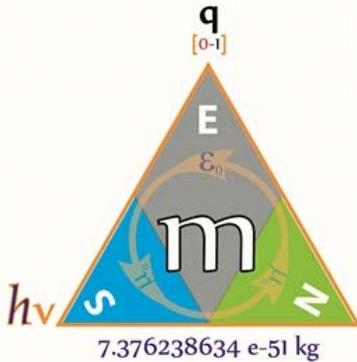


Max Planck
(April 23, 1858 – October 4, 1947)

"To interpret the vibrational energy of N oscillators not as a continuous, infinitely divisible quantity, but as a discrete quantity composed of an integral number of finite equal parts."

$\epsilon = nhv$

"Let us call each such part of the energy element h"



$7.376238634 \text{ e-}51 \text{ kg}$

Solving for Planck's Constant using the inverse of Avogadro's number & Tetryonic geometry we obtain an exact corrected value of :

$+ 6.629432672 \times 10^{-34} \text{ J.s}$

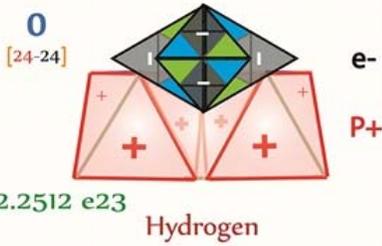
$4.137664546 \times 10^{-15} \text{ eV.s}$

N_A

1 mole of Hydrogen atoms has a rest-mass of 1 gram

$mv^2 = E = hv^2$

A rest mass Hydrogen atom has a Compton frequency of $2.2512 \text{ e}23$ Planck quanta



All Matter waveforms can be collapsed into radiant mass-energies

c^2

$T\pi \left[\left[\epsilon_0 \mu_0 \right] \cdot \left[m \Omega v^2 \right] \right]$

Matter EM Field Planck quanta
ElectroMagnetic mass velocity

Planck's constant is the relationship between EM mass-energy and quantised angular momenta that provides the basis for EM charge in Tetryonic geometries

Once these basic fundamentals of QM & Chemistry are realised geometrically progress can be made to apply these geometric definitions of quantum scale 2D masses & 3D Matter to the problem of determining an accurate value of Planck's constant with respect to the molar mass of Hydrogen and Avogadro's number

The elegance of this geometric approach to the determination of quantised mass-Matter is that it affords no room for assumptions (or known number chasing) that occurs so frequently in the mathematics of modern physics today – the charged equilateral geometry [QAM] of Planck’s constant is fixed and acts to provide a foundational quantum ‘grammar’ to the ‘language’ of mathematics in QFT and the rest of physics.

Planck rest mass-Energy momenta

$mv^2 = E = hv^2$

c^2

Planck mass: $7.376238634 \times 10^{-32} \text{ kg}$

Planck Charge: $1.3351364 \times 10^{-20} \text{ C}$ [1/12 elementary charge]

Planck Energy: $6.62969794 \times 10^{-33} \text{ J}$ [kg.m².s⁻²]

$41,3795 \text{ eV}$

Currently the Atomic masses are calculated using 1/12 of a Molar Carbon12 atom's mass as the reference mass.

Tq [Carbon] - [252-252] C [270,072] / 12
Tm [Carbon] - 270,072 12 22,506

If we calculated for the molar mass of C12 in 12 grams we would get
(0.12/N/270072) 7.378205107 x 10⁻¹² kg/mol
this is in error by 1/2 of the mass of an electron

0 [24-24] 1 gram [0.001 kg] e⁻

22,512 n H 00 P⁺

Hydrogen

Tetryonic mass [Hydrogen] - 2.2512 e23 v

Using Tetryonic geometry we can solve for an exact Compton frequency of any mass-Matter topology and account exactly for all quantum energy contributions to the rest Matter of all electrons and Baryons in any element thus determining exact molar masses exclusive of blackbody radiation, kinetic energies and energies of measurement and avoiding 'weighted' masses

Defining [N] as the number of rest mass Hydrogen atoms in 1gram exactly and makes Avagadro's number the inverse of this number

Molar mass = H₁ Atomic mass / Avagadro's No.

mass H_{mol}/Av = $\frac{.001}{6.022141579 \times 10^{23}}$

rest mass Hydrogen = 1.660538841 x 10⁻²⁷ g/mol

H_{mole} /m [H]= $\frac{1.660738412 \times 10^{-27}}{22,512}$

n Planck mass = 7.376238634 x 10⁻³² Kg

This is an exact Atomic rest mass as opposed to the current weighted molar Atomic mass estimates [which is incorrect by 1/2 the mass of an electron]

Planck's constant is the 'quantum of action' contributing to rest mass-energies in Matter when in a standing wave topology and can also contribute to rest mass-energies in radiant EM wave geometries

Quantum properties such as Compton frequency and deBroglie wavelengths can now be revealed in terms of physical geometries at the quantum scale along with the realisation that the averaged atomic mass of Hydrogen [1/12th that of Carbon12] is no longer an accurate estimate of atomic mass [being in error by ½ the mass of an electron].

For so long Chemists have ignored the mass of the electron in atomic mass calculations as being of no significance wrt the mass of a Proton, and have relied on a weighted estimate of the mass of Hydrogen for their chemical calculations and measurements.

This can now be corrected to an exact value of Hydrogen (and all other elements and compounds) inclusive of the photo-electron and its quantum level mass-energy content



Avagadros Number

The number of rest mass Hydrogen atoms in 1 gram
(and the rest molar mass of any element or compound)
can be determined directly from tetryonic theory

[exclusive of any measurement, blackbody or kinetic energies]

Using a Compton frequency of 2.2512×10^{23} Planck quanta
for a rest mass-Matter Hydrogen atom



atomic mass unit

$$1 \text{ u} = \frac{M_u}{N_A} = 1.660538782(83) \times 10^{-24} \text{ g}$$

Avogadro N = $6.022141579 \times 10^{23}$

$$N^{-1} = \frac{2.2512 \times 10^{23} \text{ v}}{[\text{Hydrogen mass}]} = \frac{2.2512 \times 10^{23} \text{ v}}{1.660538841 \times 10^{-24} \text{ g}}$$

n0 1 mol = 1 g

Hydrogen = $1.660538841 \times 10^{-27} \text{ kg}$

n1 1 mol = 1.000533 g

n0 1 mol = 11.996801 g

Carbon 12 = $1.9927152 \times 10^{-26} \text{ kg}$

n1 1 mol = 12 g

Hydrogen's rest Tetryonic mass
is 22,512 n Planck quanta
[Proton - 22,500n + electron 12n]

$$\left[22,512 \left[\left[\epsilon_0 \mu_0 \right] \cdot \left[m \Omega v^2 \right] \right] \right]^{-1}$$

EM Field Planck quanta
ElectroMagnetic mass velocity

The inverse mass of Hydrogen is
equal to Avagadros number

The ground level Hydrogen atom has a fixed mass-Matter topology of 48 pi [36p Proton + 12 pi electron] exclusive of kEM field energies of motion, and a total Planck quanta number of 2.2512 e23 which in turn must match the inverse of Avogadro's number [the number of atoms in one mole of Matter] – in the case of Hydrogen this turns out to be 1.660538841 e-24 kg

NAu = 0.001 kg

48 [24-24] e^- ^1H

22,512

1.660538841 e-27 kg

One Da is approximately equal to the mass of one proton or one neutron

36 [18-18] N^0 0.499866702 H

22,500

1.659653693 e-27 kg

36 [24-12] P^+ 0.499866702 H

22,500

Deuterium is the building block of all elements

84 [42-42] N^0 e^- ^2H

45,012

3.320192534 e-27 kg

Planck mass-energy units

The unified atomic mass unit (symbol: u) or Dalton (symbol: Da) is a unit that is used for indicating mass on an atomic or molecular scale

270,072

1/12 the mass of a C12 graphene atom at rest in its electronic ground state

$1.660538782(83) \times 10^{-27} \text{ kg}$

22,506

is an inaccurate means of determining the exact rest mass of a Hydrogen atom

22,512

Carbon 12 has 270,072n planck quanta
(270,072 / 12 = 22,506)

Hydrogen has a mass of 22,512n (22,500+12) requiring all mass to be calculated directly using the Planck mass-energy quantum (.001kg / NA / 22,512) & Tetryonic charge geometries

Using Tetryonic theory to define n Planck mass = $7.376238634 \times 10^{-32} \text{ kg}$
(see Tetryonics QM 15.04)

exact atomic rest masses for all particles, elements and compounds can be determined directly from atomic theory

$N_A = 6.02214179 \times 10^{23}$

The mole is the amount of substance of a system which contains as many elementary entities as there are atoms in 0.012 kilogram of carbon 12; its symbol is "mol".

NA(12u) = 0.012 kg

504 [254-254] ^{12}C 11,996

270,072

6 [s1]

6 Protons [24-12] n1
6 Neutrons [18-18]
6 electrons [0-12]

Carbon has a number of differing atomic configurations (allotropes)

6 Protons [24-12] n1-2
6 Neutrons [18-18]
6 electrons [0-12]

504 [252-252] ^6C 12.6493

284,760

[He] 2s2 2p2

We can then further apply this value for the rest mass of Hydrogen to the number of quanta in Hydrogen's mass-Matter topology as per Tetryonic theory [$H = 2.2512 \text{ e}^{23}$ Planck quanta] to determine an exact value of Planck's constant from first foundations and its application to QM, QED & Chemistry.

Redefining Atomic weights

Atomic weight (symbol: A_r) is a dimensionless physical quantity, the ratio of the average mass of atoms of an element (from a given source) to 1/12 of the mass of an atom of carbon-12 (known as the unified atomic mass unit)

Carbon 12

Unified atomic Matter unit

The 'unified atomic mass unit' currently in use is known to be inaccurate and must be corrected in order to bring clarity & increased accuracy to the atomic weights of all elements

$A_r = 22,512$
Hydrogen

Defining Hydrogen as having an exact atomic Planck mass of $22512n$ quanta provides uniformity with Tetryonics

1/12 C_{12}

$A_r = 22,506$

Deuterium is the building block of all elements in the period table

$A_r = 45,012$
Deuterium

Defining Deuterium as having an exact atomic Planck mass of $45012n$ quanta reflects the true charged geometries of all Elements and allotropes

D

1/6 C

Leading to a major re-definition of averaged atomic masses and atomic weights in Chemistry.

This value in concert with Tetryonic theory and Avogadro's number then permits us to model and estimate the exact rest molar mass content of all Matter topologies in turn leading us to a major correction in the topological model of all atomic nuclei and compounds

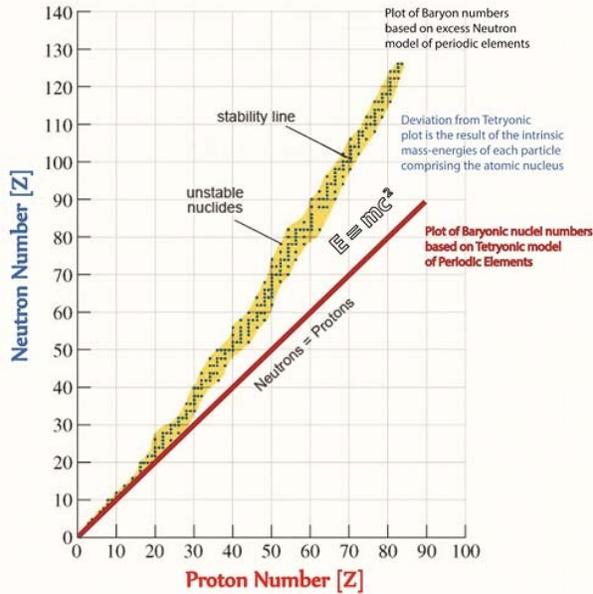
Of particular note is the fact that Tetryonic theory clearly shows that Deuterium [not Hydrogen] is the foundational Matter quantum of all periodic elements and atomic nuclei.

Deuterium alone can account for the Schrodinger wave numbers of periodic elements and provide a mechanism for the binding of protons and neutrons in atomic nuclei that the current atomic model fails to provide – as a result it is clearly demonstrated that there are no 'excess neutrons contributing to atomic mass and each element has equal numbers of protons, neutrons and electrons in accordance with their atomic Z numbers.

All of which can and have been modelled in 3D in Tetryonic Chemistry illustrations, along with all their quantum properties to provide the first complete atomic topology of all elements and compounds

Proton - Neutron Curve

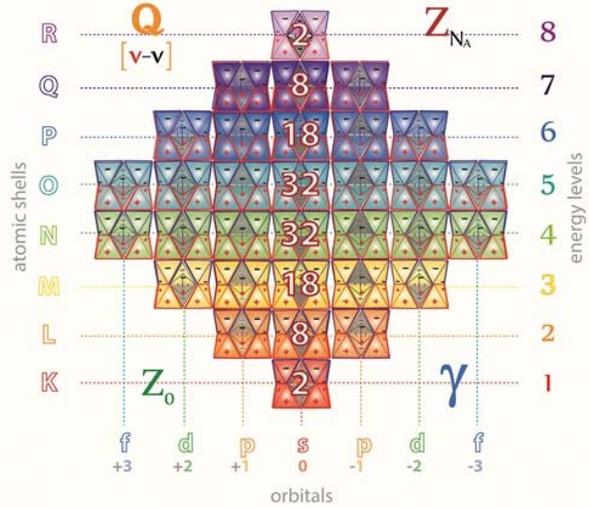
The graph below is a plot of neutron number against proton number. It is used as rule to determine which nuclei are stable or unstable.



Historically, Proton-electron numbers are viewed as being equivalent in neutral elementary matter with the excess molar mass measured being the result of 'excess or extra' Neutrons in the atom

Atomic Nuclei Numbers

All periodic elements have an EQUAL number of Protons, Neutrons & Electrons with their atomic Matter being determined by their quantum level mass-energies



Tetryonic modelling of charged mass-ENERGY-Matter geometries of elementary atoms and the nuclei that comprise them, reveals a DIRECT LINEAR relationship for Proton-electron-Neutron numbers in all periodic elements and nuclear isotopes

..... providing a much closer match to the quantum numbers of Schrodinger's wave equation for all elements and creating a new periodic table and accurate 3D quantum models of all atoms in the process.

The new Periodic table of elements (reflecting the quantum topology of all Matter)

