New Calculation of the Frequencies of Fundamental Particles (Proton, Electron, ...) and their Applications in the Universe

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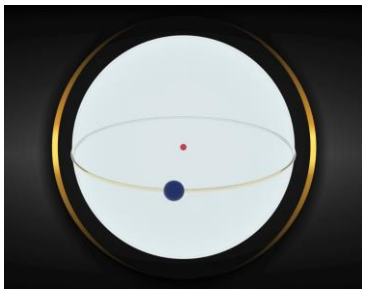
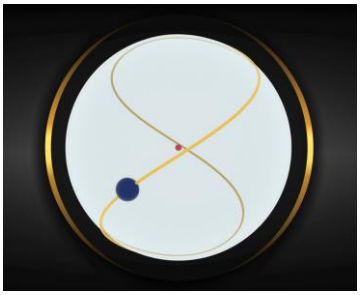
We consider an atom which has a central nucleus and electrons that orbit around it. The motion of electrons around the nucleus is an obvious and clear matter. However, since these electrons revolve around the nucleus, they possess repetitive motion and consequently have a periodic cycle with a specific velocity. Therefore, one can define a continuous closed curve for the motion of electrons around the nucleus which has a particular frequency and periodic cycle. Using the relationships below, one can obtain the frequency of different electrons.

In light of the previous articles, the electron's movement around the nucleus is a combination of several types of motions:

I. **Planet-Like Motion**: The electron orbits around the nucleus like a planet. This is a simple motion, and Newtonian laws govern it.



II. **Closed Helical Path Motion:** As previously stated, "each electron revolves around itself at a speed close to the speed of light." This motion causes curvature in the path of the solar motion of the electron, transforming its path around the nucleus into a closed helix. Note that this motion is a back-and-forth movement.



III. **Spherical Motion Around the Nucleus:** Atomic nuclei carry a positive charge, while electrons carry a negative charge. It can be said that atomic nuclei affect electrons. On the other hand, atomic nuclei rotate around themselves at a speed close to the speed of light. This rotation causes an additional rotational motion to be added to the helical path of electron motion. Consequently, the electron is rotating around the nucleus and sweeping the entire surface of a sphere with an atomic radius.

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A. Calculating the Frequency of Electron of Hydrogen Atom

Given the helical path of electron motion around the nucleus, the frequency of its motion can be determined using the following equations and a straightforward method:

$$Speed = \frac{Distance}{Time} = Distance \times Frequency$$

So, in general, it can be said:

$$Frequency = \frac{Linear\ Speed}{Linear\ Distance} = \frac{Wave-Like\ Speed}{Wave-Like\ Distance} = \frac{Helical\ Speed}{Helical\ Distance}$$

Therefore, the frequency of a single electron in a hydrogen atom can be calculated as follows:

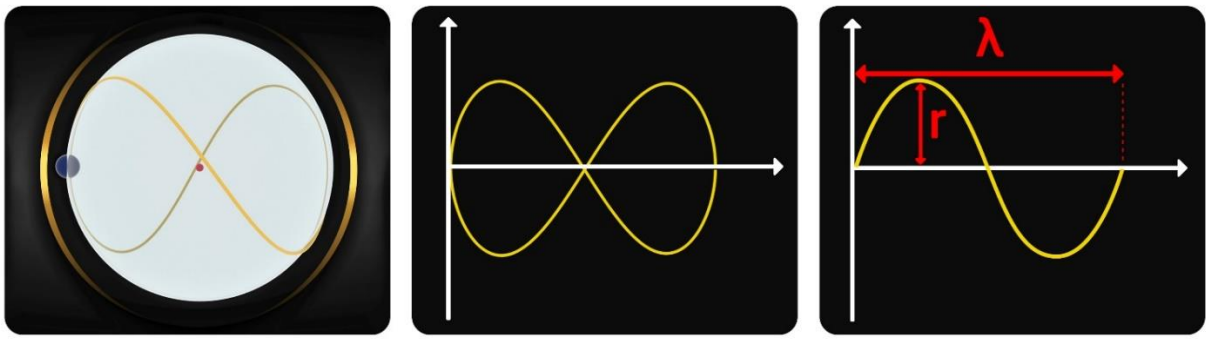
$$\left.\begin{array}{l} f_{e(H)} = \dfrac{C}{\lambda} \\ \lambda = 4r \end{array}\right\} \Rightarrow f_{e(H)} = \frac{C}{4r_H} = \frac{3 \times 10^8}{4 \times 1.1 \times 10^{-10}}$$

$$\Rightarrow \boldsymbol{f_{e(H)} = 6.82 \times 10^{17}\ Hz}$$

In this context, $\boldsymbol{\lambda}$ represents the wavelength, C is the speed of light, and $f_{e(H)}$ denotes the frequency of the electron in the hydrogen atom. The parameter r_H, equivalent to the radius, corresponds to the atomic radius of hydrogen. As another illustrative example, let's calculate the electron frequency for the outermost layer of a **Gold** atom:

$$f_{e(AU)} = \frac{C}{4r_{AU}} = \frac{3 \times 10^8}{4 \times 1.66 \times 10^{-10}}$$

$$\Rightarrow \boldsymbol{f_{e(AU)} = 4.52 \times 10^{17}\ Hz}$$



On the other hand, in previous articles we have proved that atomic nuclei also rotate around themselves, and their rotation is an obvious and clear matter. Therefore, the path of motion of nuclei is also a continuous closed curve. Hence, this motion also possesses frequency.

B. Calculating of the Frequency of Proton of Hydrogen Atom

It is quite clear that the Moon orbits around itself and around the Earth, which is itself rotating around its axis and around the Sun. The Sun, in turn, orbits around itself and around the central black hole of the Milky Way galaxy. The black hole is also in a state of rotation. Additionally, electrons orbit around themselves and around the nuclei of atoms. The nuclei, too, rotate around themselves at the speed of light. Therefore, one can write a repeatable sinusoidal equation for the rotation of a proton around itself:

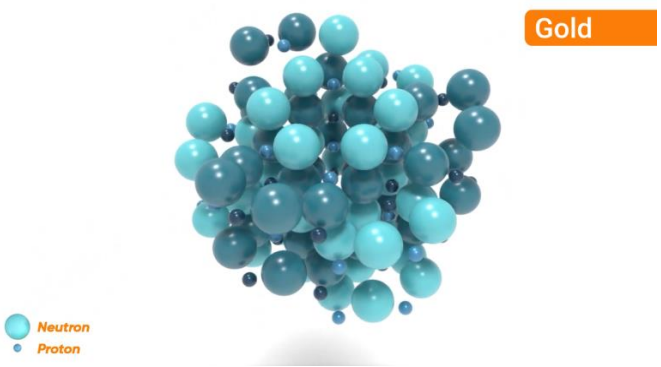
$$f_{p(H)} = \frac{C}{d} \Rightarrow f_{p(H)} = \frac{C}{2\pi r} = \frac{3 \times 10^8}{2\pi \times 1.20 \times 10^{-15}}$$

$$\Rightarrow \boldsymbol{f_{p(H)} = 3.98 \times 10^{22}\ Hz}$$

In which $\boldsymbol{r}$ is the radius, and $\boldsymbol{f_{p(H)}}$ is the frequency of proton of the hydrogen atom. Now, let's proceed to calculate the frequency of the atomic nucleus of Gold $\boldsymbol{f_{p(AU)}}$:

$$f_{p(AU)} = \frac{C}{d} \Rightarrow f_{p(AU)} = \frac{C}{2\pi r} = \frac{3 \times 10^8}{2\pi \times 6.49 \times 10^{-15}}$$

$$\Rightarrow \boldsymbol{f_{p(AU)} = 7.36 \times 10^{21}\ Hz}$$



Saleh Comprehensive Frequency Table

GROUP 1 IA	2 IIA	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8 VIII	9 VIII	10 VIII	11 IB	12 IIB	13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	18 VIIIA
1 **H** Hydrogen 110 1.2 6.82E+17 3.98E+22																	2 **He** Helium 140 1.9 5.36E+17 2.51E+22
3 **Li** Lithium 182 2.18 4.12E+17 2.19E+22	4 **Be** Beryllium 153 2.4 4.90E+17 1.99E+22											5 **B** Boron 192 2.59 3.91E+17 1.85E+22	6 **C** Carbon 170 2.75 4.41E+17 1.74E+22	7 **N** Nitrogen 155 2.89 4.84E+17 1.65E+22	8 **O** Oxygen 152 3.02 4.93E+17 1.58E+22	9 **F** Fluorine 147 3.14 5.10E+17 1.52E+22	10 **Ne** Neon 154 3.26 4.87E+17 1.47E+22
11 **Na** Sodium 227 3.36 3.30E+17 1.42E+22	12 **Mg** Magnesium 173 3.46 4.34E+17 1.38E+22											13 **Al** Aluminum 184 3.55 4.08E+17 1.34E+22	14 **Si** Silicon 210 3.64 3.57E+17 1.31E+22	15 **P** Phosphorus 180 3.73 4.17E+17 1.28E+22	16 **S** Sulfur 180 3.81 4.17E+17 1.25E+22	17 **Cl** Chlorine 175 3.89 4.29E+17 1.23E+22	18 **Ar** Argon 188 3.96 3.99E+17 1.21E+22
19 **K** Potassium 275 4.03 2.73E+17 1.18E+22	20 **Ca** Calcium 231 4.1 3.25E+17 1.16E+22	21 **Sc** Scandium 230 4.17 3.26E+17 1.15E+22	22 **Ti** Titanium 200 4.24 3.55E+17 1.13E+22	23 **V** Vanadium 242 4.3 3.19E+17 1.11E+22	24 **Cr** Chromium 245 4.36 3.06E+17 1.10E+22	25 **Mn** Manganese 161 4.42 4.66E+17 1.08E+22	26 **Fe** Iron 192 4.48 3.91E+17 1.07E+22	27 **Co** Cobalt 192 4.54 3.91E+17 1.05E+22	28 **Ni** Nickel 163 4.59 4.60E+17 1.04E+22	29 **Cu** Copper 140 4.65 5.36E+17 1.03E+22	30 **Zn** Zinc 139 4.7 5.40E+17 1.02E+22	31 **Ga** Gallium 187 4.75 4.01E+17 1.01E+22	32 **Ge** Germanium 211 4.8 3.55E+17 9.95E+21	33 **As** Arsenic 185 4.85 4.05E+17 9.85E+21	34 **Se** Selenium 190 4.9 3.95E+17 9.75E+21	35 **Br** Bromine 185 4.95 4.05E+17 9.66E+21	36 **Kr** Krypton 202 4.99 3.71E+17 9.57E+21
37 **Rb** Rubidium 303 5.04 2.48E+17 9.48E+21	38 **Sr** Strontium 249 5.08 3.01E+17 9.40E+21	39 **Y** Yttrium 219 5.13 3.42E+17 9.32E+21	40 **Zr** Zirconium 211 5.17 3.55E+17 9.24E+21	41 **Nb** Niobium 198 5.21 3.79E+17 9.16E+21	42 **Mo** Molybdenum 190 5.26 3.95E+17 9.09E+21	43 **Tc** Technetium 183 5.3 4.10E+17 9.02E+21	44 **Ru** Ruthenium 178 5.34 4.21E+17 8.95E+21	45 **Rh** Rhodium 173 5.38 4.34E+17 8.88E+21	46 **Pd** Palladium 163 5.42 4.60E+17 8.82E+21	47 **Ag** Silver 172 5.46 4.36E+17 8.76E+21	48 **Cd** Cadmium 158 5.49 4.75E+17 8.69E+21	49 **In** Indium 193 5.53 3.89E+17 8.63E+21	50 **Sn** Tin 217 5.57 3.46E+17 8.58E+21	51 **Sb** Antimony 206 5.61 3.64E+17 8.52E+21	52 **Te** Tellurium 206 5.64 3.64E+17 8.47E+21	53 **I** Iodine 198 5.68 3.79E+17 8.41E+21	54 **Xe** Xenon 216 5.71 3.47E+17 8.36E+21
55 **Cs** Cesium 343 5.75 2.19E+17 8.31E+21	56 **Ba** Barium 268 5.78 2.80E+17 8.26E+21	Lanthanide Series	72 **Hf** Hafnium 208 6.29 3.61E+17 7.59E+21	73 **Ta** Tantalum 200 6.32 3.75E+17 7.56E+21	74 **W** Tungsten 193 6.35 3.89E+17 7.53E+21	75 **Re** Rhenium 188 6.38 3.99E+17 7.49E+21	76 **Os** Osmium 185 6.4 4.05E+17 7.46E+21	77 **Ir** Iridium 180 6.43 4.75E+17 7.43E+21	78 **Pt** Platinum 175 6.46 4.29E+17 7.40E+21	79 **Au** Gold 166 6.49 4.52E+17 7.36E+21	80 **Hg** Mercury 155 6.51 4.84E+17 7.33E+21	81 **Tl** Thallium 196 6.54 3.83E+17 7.30E+21	82 **Pb** Lead 202 6.57 3.71E+17 7.27E+21	83 **Bi** Bismuth 207 6.6 3.62E+17 7.24E+21	84 **Po** Polonium 197 6.62 3.81E+17 7.21E+21	85 **At** Astatine 202 6.65 3.71E+17 7.19E+21	86 **Rn** Radon 220 6.65 3.41E+17 7.16E+21
87 **Fr** Francium 348 6.7 2.16E+17 7.13E+21	88 **Ra** Radium 283 6.72 2.65E+17 7.10E+21	Actinide Series	104 **Rf** Rutherfordium 199 7.11 3.75E+17 6.72E+21	105 **Db** Dubnium 198 7.13 3.79E+17 6.70E+21	106 **Sg** Seaborgium 197 7.16 3.81E+17 6.68E+21	107 **Bh** Bohrium 196 7.18 3.83E+17 6.66E+21	108 **Hs** Hassium 195 7.2 3.85E+17 6.63E+21	109 **Mt** Meitnerium 194 7.22 3.87E+17 6.61E+21	110 **Ds** Darmstadtium 193 7.24 3.89E+17 6.59E+21	111 **Rg** Roentgenium 192 7.27 3.91E+17 6.57E+21	112 **Cn** Copernicium 190 7.29 2.95E+17 6.55E+21	113 **Nh** Nihonium 190 7.31 3.95E+17 6.54E+21	114 **Uuq** Ununquadium 187 7.33 4.01E+17 6.52E+21	115 **Mc** Moscovium 185 7.25 4.05E+17 6.50E+21	116 **Lv** Livermorium 183 7.37 4.10E+17 6.48E+21	117 **Ts** Tennessine 180 7.39 4.17E+17 6.46E+21	118 **Og** Oganesson 192 7.42 4.93 6.44E+21

Lanthanides	57 **La** Lanthanum 187 5.62 4.01E+17 8.21E+21	58 **Ce** Cerium 232 5.85 3.23E+17 8.16E+21	59 **Pr** Praseodymium 231 5.89 3.25E+17 8.12E+21	60 **Nd** Neodymium 228 5.92 3.29E+17 8.07E+21	61 **Pm** Promethium 183 5.95 4.19E+17 8.03E+21	62 **Sm** Samarium 229 5.98 3.28E+17 7.98E+21	63 **Eu** Europium 233 6.02 3.22E+17 7.94E+21	64 **Gd** Gadolinium 233 6.05 3.22E+17 7.90E+21	65 **Tb** Terbium 225 6.08 3.33E+17 7.86E+21	66 **Dy** Dysprosium 228 6.11 3.29E+17 7.82E+21	67 **Ho** Holmium 226 6.14 3.32E+17 7.78E+21	68 **Er** Erbium 226 6.17 3.32E+17 7.74E+21	69 **Tm** Thulium 222 6.2 3.38E+17 7.70E+21	70 **Yb** Ytterbium 222 6.23 3.38E+17 7.67E+21	71 **Lu** Lutetium 217 6.26 3.46E+17 7.63E+21
Actinides	89 **Ac** Actinium 215 6.75 3.49E+17 7.08E+21	90 **Th** Thorium 206 6.78 3.64E+17 7.05E+21	91 **Pa** Protactinium 200 6.8 3.75E+17 7.02E+21	92 **U** Uranium 186 6.83 4.03E+17 7.00E+21	93 **Np** Neptunium 186 6.85 4.03E+17 6.97E+21	94 **Pu** Plutonium 175 6.87 4.29E+17 6.93E+21	95 **Am** Americium 186 6.9 4.03E+17 6.92E+21	96 **Cm** Curium 204 6.92 3.68E+17 6.90E+21	97 **Bk** Berkelium 204 6.95 3.68E+17 6.88E+21	98 **Cf** Californium 204 6.97 3.68E+17 6.85E+21	99 **Es** Einsteinium 204 6.99 3.68E+17 6.83E+21	100 **Fm** Fermium 204 7.02 3.68E+17 6.81E+21	101 **Md** Mendelevium 204 7.04 3.68E+17 6.78E+21	102 **No** Nobelium 204 7.06 3.68E+17 6.76E+21	103 **Lr** Lawrencium 204 7.09 3.68E+17 6.74E+21

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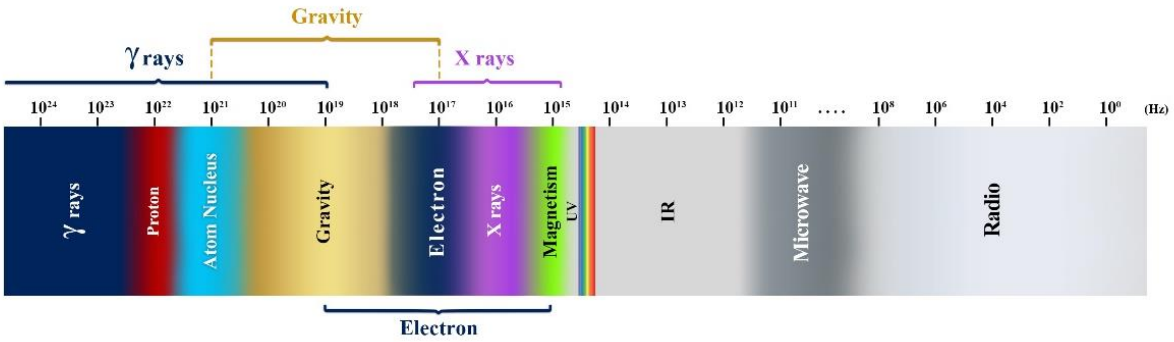

Consequently, one can say that all fundamental particles possess frequency, and these frequencies can be utilized in various applications.

C. Design and Manufacture of Gravitational and Electron Lasers to Bombard Atoms

Consider the frequency of a specific electron or nucleus of a specific atom to be F1, if we design a laser with the same frequency F1 and emit to that atom, the resonance phenomenon will occur, resulting in fission. According to equations ($C = \lambda F$ or $C = \lambda/T$) the same frequencies mean having the same wavelength and equality of the rotational radius of the photons of the laser and the electron or nucleus of the atom.

If the laser has the same frequency as a specific electron in an atom (meaning it has the same wavelength or rotational radius R_{mom}), they could collide at a specific point. If the frequencies differ, the probability of collision decreases, and it may not occur at all. This is because a photon traverses in a helical path similar to a spring. When these photons are shaped into a laser, it is like an array of photons with a specific and defined radius traversing along a helical path, essentially creating a cylindrical shell.

If the radius of the inner cavity of this cylindrical shell does not match the rotational radius of the electron or nucleus of the atom, either no collision will occur or the probability of collision will be extremely low. The bombarded particles will pass through the central empty space or tunnel without collision. In reality, the optimal laser effect is achieved when the particular laser particles and the electron or nuclear particles have the same rotational radius (same frequency).

Given these explanations and the frequency values of electrons and nuclei, we must manufacture a specific laser to achieve the desired fission from the collision of the laser and the atom.

Note:

Given the extremely high difference between the rotational radius of electrons (and nuclei) of atoms and the rotational radius of visible lasers, these types of lasers are not suitable for the fission of an atom. We need to develop a laser with a frequency of at least 10^{18} Hz, as common lasers are not applicable. For the fission of a nucleus using this method, we propose using gravitational lasers or electron lasers.

References:

[1] Saleh, Gh. "A Novel Approach to the Fission of All Elements in the Periodic Table, by Means of the Resonance Phenomenon (Kurush Fission)." *APS Meeting Abstracts*. 2025.

[2] Saleh, Gh. "A New Method for Fission of Atoms of Elements Using the Resonance Phenomenon 2024." Saleh Theory, 11 Aug. 2024, https://www.saleh-theory.com/article/a-new-method-for-fission-of-atoms-of-elements-using-the-resonance-phenomenon-2024

[3] Saleh, Gh. "A New Explanation for the Formation and Structure of Orbitals ($1s^2$) in the Universe 2024, Part B." Saleh Theory, 29 Jan. 2024, https://www.saleh-theory.com/article/a-new-explanation-for-the-formation-and-structure-of-orbitals-1s2-in-the-universe-2024-part-b