Physical Variable:	Momentum:	Mass:	Frequency:	Wavelength:
Mass	$\frac{p}{c}$	m	$\frac{h \cdot f}{c^2}$	$\frac{h}{c \cdot \lambda}$
Frequency	$\frac{p}{M}$	$\frac{m \cdot c^2}{h}$	f	$\frac{c}{\lambda}$
Wavelength	$\frac{h}{p}$	$\frac{h}{m \cdot c}$	$\frac{c}{f}$	λ
Momentum	p	$m \cdot c$	$\frac{h \cdot f}{c}$	$\frac{h}{\lambda}$
Acceleration	$\frac{p \cdot c^2}{\hbar}$	$\frac{m \cdot c^3}{\hbar}$	$\omega \cdot c$	$\frac{c^2}{r}$
Strong Force	$\frac{p^2 \cdot c}{\hbar}$	$\frac{m^2 \cdot c^3}{\hbar}$	$\frac{\hbar \cdot \omega^2}{c}$	$\frac{\hbar \cdot c}{r^2}$
Total Energy	$p \cdot c$	$m \cdot c^2$	$h \cdot f$	$\frac{h \cdot c}{\lambda}$
Power	$\frac{p^2 \cdot c^2}{h}$	$\frac{m^2 \cdot c^4}{h}$	$h \cdot f^2$	$\frac{h \cdot c^2}{\lambda^2}$
Mass flow	$\frac{p^2}{h}$	$\frac{m^2 \cdot c^2}{h}$	$\frac{h \cdot f^2}{c^2}$	$\frac{h}{\lambda^2}$
Gravity const.	$\frac{h \cdot c^3}{2\pi \cdot p^2}$	$\frac{h \cdot c}{2\pi \cdot m^2}$	$\frac{c^5}{\hbar \cdot \omega^2}$	$\frac{c^3 \cdot r^2}{\hbar}$
Mom.of Inertia	$\frac{\hbar^2}{p \cdot c}$	$\frac{\hbar^2}{m \cdot c^2}$	$\frac{\hbar}{\omega}$	$\frac{\hbar \cdot r}{c}$
Mass Density	$\frac{4\pi \cdot p^4}{h^3 \cdot c}$	$\frac{4\pi \cdot m^4}{M^3}$	$\frac{4\pi \cdot h \cdot f^4}{c^5}$	$\frac{4\pi \cdot h}{c \cdot \lambda^4}$
Volume	$\frac{h^3}{4\pi \cdot p^3}$	$\frac{M^3}{4\pi \cdot m^3}$	$\frac{c^3}{4\pi \cdot f^3}$	$2\pi^2 \cdot r^3$
Viscousity	$\frac{p^3}{h^2}$	$\frac{m^3 \cdot c^3}{h^2}$	$\frac{h \cdot f^3}{c^3}$	$\frac{h}{\lambda^3}$
Diffusivity / Circulation	$\frac{\hbar \cdot c}{p}$	$\frac{\hbar}{m}$	$\frac{c^2}{\omega}$	$c \cdot r$
Pressure	$\frac{p^4 \cdot c}{2\pi^2 \cdot \hbar^3}$	$\frac{m^4 \cdot c^5}{2\pi^2 \cdot \hbar^3}$	$\frac{\hbar \cdot \omega^4}{2\pi^2 \cdot c^3}$	$\frac{4\pi \cdot h \cdot c}{\lambda^4}$
Area	$\frac{h^2}{p^2}$	$\frac{M^2}{m^2}$	$\frac{c^2}{f^2}$	$4\pi^2 \cdot r^2$
Tension	$\frac{p^3 \cdot c}{\hbar^2}$	$\frac{m^3 \cdot c^4}{\hbar^2}$	$\frac{\hbar \cdot \omega^3}{c^2}$	$\frac{\hbar \cdot c}{r^3}$
Mass – tube	$\frac{p^2}{\hbar \cdot c}$	$\frac{m^2 \cdot c}{\hbar}$	$\frac{\hbar \cdot \omega^2}{c^3}$	$\frac{\hbar}{c \cdot r^2}$
Volume flow	$\frac{h^2 \cdot c}{4\pi \cdot p^2}$	$\frac{\pi \cdot \hbar}{m^2 \cdot c^4}$	$\frac{\pi \cdot c^3}{\omega^2}$	$\pi \cdot c \cdot r^2$

Physical Variable:	Momentum:	Mass:	Angular Speed:	Compton Radius:
Gyromagn. Ratio	$\frac{c\cdot e}{p}$	$\frac{e}{m}$	$\frac{e\cdot c^2}{\hbar\cdot\omega}$	$\frac{e\cdot c\cdot r}{\hbar}$
Electric Current	$\frac{c\cdot e\cdot p}{h}$	$\frac{e\cdot m\cdot c^2}{h}$	$e\cdot f$	$\frac{e\cdot c}{\lambda}$
Mag. Moment	$\frac{\hbar\cdot c\cdot e}{2\cdot p}$	$\frac{\hbar\cdot e}{2\cdot m}$	$\frac{e\cdot c^2}{2\cdot\omega}$	$\frac{1}{2}\cdot c\cdot e\cdot r$
Mag. Potential	$\frac{p}{\alpha\cdot e}$	$\frac{m\cdot c}{\alpha\cdot e}$	$\frac{\hbar\cdot\omega}{\alpha\cdot e\cdot c}$	$\frac{h}{2\pi\cdot\alpha\cdot e\cdot r}$
Line Charge	$\frac{e\cdot p}{\alpha\cdot h}$	$\frac{e\cdot m\cdot c}{\alpha\cdot h}$	$\frac{e\cdot f}{\alpha\cdot c}$	$\frac{e}{2\pi\cdot\alpha\cdot r}$
Electric Field	$\frac{p^2\cdot c}{\alpha\cdot e\cdot\hbar}$	$\frac{m^2\cdot c^3}{\alpha\cdot e\cdot\hbar}$	$\frac{\hbar\cdot\omega^2}{\alpha\cdot e\cdot c}$	$\frac{\hbar\cdot c}{\alpha\cdot e\cdot r^2}$
Elec. Potential	$\frac{p\cdot c}{e}$	$\frac{m\cdot c^2}{e}$	$\frac{h\cdot f}{e}$	$\frac{\hbar\cdot c}{e\cdot r}$
Mag. Intensity	$\frac{e\cdot p^2\cdot c}{2\pi\cdot\alpha^3\cdot\hbar^2}$	$\frac{e\cdot m^2\cdot c^3}{2\pi\cdot\alpha^3\cdot\hbar^2}$	$\frac{2\pi\cdot e\cdot f^2}{\alpha^3\cdot c}$	$\frac{e\cdot c}{2\pi\cdot\alpha^3\cdot r^2}$
Mag. Induction	$\frac{4\pi\cdot p^2}{\alpha^2\cdot e\cdot h}$	$\frac{4\pi\cdot m^2\cdot c^2}{\alpha^2\cdot e\cdot h}$	$\frac{4\pi\cdot h\cdot f^2}{\alpha^2\cdot e\cdot c^2}$	$\frac{2\cdot\hbar}{\alpha^2\cdot e\cdot r^2}$
Charge Mobility	$\frac{e\cdot h}{p^2}$	$\frac{e\cdot h}{m^2\cdot c^2}$	$\frac{e\cdot c^2}{h\cdot f^2}$	$\frac{2\pi\cdot e\cdot r^2}{\hbar}$
Capacitance	$\frac{e^2}{p\cdot c}$	$\frac{e^2}{m\cdot c^2}$	$\frac{e^2}{\hbar\cdot\omega}$	$\frac{e^2\cdot r}{\hbar\cdot c}$
Inductance	$\frac{\hbar^2}{e^2\cdot p\cdot c}$	$\frac{\hbar^2}{e^2\cdot m\cdot c^2}$	$\frac{\hbar}{e^2\cdot\omega}$	$\frac{\hbar\cdot r}{c\cdot e^2}$
Current Density	$\frac{e\cdot p^3\cdot c}{2\pi^2\cdot\alpha^2\cdot\hbar^3}$	$\frac{e\cdot m^3\cdot c^4}{2\pi^2\cdot\alpha^2\cdot\hbar^3}$	$\frac{4\pi\cdot e\cdot f^3}{\alpha^2\cdot c^2}$	$\frac{e\cdot c}{2\pi^2\cdot\alpha^2\cdot r^3}$
Conductivity	$\frac{e^2\cdot p}{h^2}$	$\frac{e^2\cdot m\cdot c}{h^2}$	$\frac{e^2\cdot f}{h\cdot c}$	$\frac{e^2}{2\pi\cdot h\cdot r}$
Reluctance	$\frac{e^2\cdot p\cdot c}{h^2}$	$\frac{e^2\cdot m\cdot c^2}{h^2}$	$\frac{e^2\cdot f}{h}$	$\frac{e^2\cdot c}{2\pi\cdot h\cdot r}$
Pointing Flow	$\frac{p^4\cdot c^2}{2\pi\cdot\alpha^4\cdot\hbar^3}$	$\frac{m^4\cdot c^6}{2\pi\cdot\alpha^4\cdot\hbar^3}$	$\frac{\hbar\cdot\omega^4}{\alpha^4\cdot c^2}$	$\frac{\hbar\cdot c^2}{2\pi\cdot\alpha^4\cdot r^4}$
Displacement	$\frac{\pi\cdot e\cdot p^2}{\alpha^2\cdot h^2}$	$\frac{\pi\cdot e\cdot m^2\cdot c^2}{\alpha^2\cdot h^2}$	$\frac{\pi\cdot e\cdot f^2}{\alpha^2\cdot c^2}$	$\frac{e}{4\pi\cdot\alpha^2\cdot r^2}$
Electric Curl	$\frac{p^3\cdot c}{\alpha\cdot e\cdot\hbar^2}$	$\frac{m^3\cdot c^4}{\alpha\cdot e\cdot\hbar^2}$	$\frac{\hbar\cdot\omega^3}{\alpha\cdot e\cdot c}$	$\frac{\hbar\cdot c}{\alpha\cdot e\cdot r^3}$
Electric Mom.	$\frac{h\cdot e}{p}$	$\frac{h\cdot e}{m\cdot c}$	$\frac{e\cdot c}{f}$	$2\pi\cdot e\cdot r$
Charge Density	$\frac{4\pi\cdot e\cdot p^3}{\alpha^3\cdot h^3}$	$\frac{4\pi\cdot e\cdot m^3}{\alpha^3\cdot M^3}$	$\frac{4\pi\cdot e\cdot f^3}{\alpha^3\cdot c^3}$	$\frac{e}{2\pi^2\cdot\alpha^3\cdot r^3}$

Physical constant:	Letter:	Definition:	Permittivity:	Permeability:
Speed of light	$c =$	$\frac{1}{\sqrt{\varepsilon_0 \cdot \mu_0}}$	$\frac{\frac{1}{2}\cdot e^2}{\alpha \cdot \varepsilon_0 \cdot h}$	$\frac{\alpha \cdot h}{\frac{1}{2}\cdot \mu_0 \cdot e^2}$
Fine Structure Cons.	$\alpha =$	$\frac{9}{32\cdot\pi^3}\cdot\left(\frac{2\pi}{15}\right)^{1/4}$	$\frac{\frac{1}{2}\cdot e^2}{\varepsilon_0 \cdot h \cdot c}$	$\frac{\frac{1}{2}\cdot \mu_0 \cdot c \cdot e^2}{h}$
Lum. Resistance	$R_0 =$	$\frac{\alpha \cdot h}{\frac{1}{2}\cdot e^2}$	$\frac{1}{\varepsilon_0 \cdot c}$	$\mu_0 \cdot c$
Lum. Conductance	$G_0 =$	$\frac{\frac{1}{2}\cdot e^2}{\alpha \cdot h}$	$\varepsilon_0 \cdot c$	$\frac{1}{\mu_0 \cdot c}$
Permeability	$\mu_0 =$	$\frac{\alpha \cdot h}{\frac{1}{2}\cdot e^2 \cdot c}$	$\frac{1}{\varepsilon_0 \cdot c^2}$	$\frac{2\pi}{5\cdot 10^6}$
Permittivity	$\varepsilon_0 =$	$\frac{\frac{1}{2}\cdot e^2}{\alpha \cdot h \cdot c}$	$\frac{5\cdot 10^6}{2\pi \cdot c^2}$	$\frac{1}{\mu_0 \cdot c^2}$
Planck Action	$h =$	$M_0 \cdot c$	$\frac{\frac{1}{2}\cdot e^2}{\alpha \cdot \varepsilon_0 \cdot c}$	$\frac{\frac{1}{2}\cdot \mu_0 \cdot c \cdot e^2}{\alpha}$
Angular mom.	$\hbar =$	$\frac{h}{2\pi}$	$\frac{e^2}{4\pi \cdot \varepsilon_0 \cdot \alpha \cdot c}$	$\frac{\mu_0 \cdot c \cdot e^2}{4\pi \cdot \alpha}$
Mass moment	$M_0 =$	$\frac{h}{c}$	$\frac{\frac{1}{2}\cdot e^2}{\alpha \cdot \varepsilon_0 \cdot c^2}$	$\frac{\frac{1}{2}\cdot \mu_0 \cdot e^2}{\alpha}$
Charge	$q_e = e =$	$1000\cdot\left(\frac{5\cdot\alpha\cdot h}{\pi \cdot c}\right)^{1/2}$	$(2\alpha \cdot \varepsilon_0 \cdot c \cdot h)^{1/2}$	$\left(\frac{2\alpha \cdot h}{\mu_0 \cdot c}\right)^{1/2}$
Magnetic Flux	$[\vec{B} \circ \vec{S}]_h =$	$\frac{h}{e}$	$\left(\frac{h}{2\alpha \cdot \varepsilon_0 \cdot c}\right)^{1/2}$	$\left(\frac{\mu_0 \cdot h \cdot c}{2\alpha}\right)^{1/2}$
Hall – Conduct.	$G_H =$	$\frac{\frac{1}{2}\cdot e^2}{h}$	$\alpha \cdot \varepsilon_0 \cdot c$	$\frac{\alpha}{\mu_0 \cdot c}$
Hall – Resist.	$R_H =$	$\frac{h}{\frac{1}{2}\cdot e^2}$	$\frac{1}{\alpha \cdot \varepsilon_0 \cdot c}$	$\frac{\mu_0 \cdot c}{\alpha}$
El. Dipole Osc.	$\dot{p} =$	$e \cdot c$	$(2\alpha \cdot \varepsilon_0 \cdot h \cdot c^3)^{1/2}$	$\left(\frac{2\alpha \cdot h \cdot c}{\mu_0}\right)^{1/2}$
Hall – Permeab.	$\mu_H =$	$\frac{h}{e^2 \cdot c}$	$\frac{1}{2\alpha \cdot \varepsilon_0 \cdot c^2}$	$\frac{\mu_0}{2\alpha}$
Hall – Permitt.	$\varepsilon_H =$	$\frac{e^2}{h \cdot c}$	$2\alpha \cdot \varepsilon_0$	$\frac{2\alpha}{\mu_0 \cdot c^2}$
Spin Action	$\alpha \cdot \hbar =$	$\frac{\alpha \cdot h}{2\pi}$	$\frac{e^2}{4\pi \cdot \varepsilon_0 \cdot c}$	$\frac{\mu_0 \cdot c \cdot e^2}{4\pi}$
Orbital Action	$\frac{1}{2}\alpha^2 \cdot \hbar =$	$\frac{\alpha^2 \cdot h}{4\pi}$	$\frac{e^4}{16\pi \cdot \varepsilon_0{}^2 \cdot h \cdot c^2}$	$\frac{\mu_0{}^2 \cdot e^4 \cdot c^2}{16\pi \cdot h}$
Energy – Chord	$\hbar \cdot c$	$\frac{h \cdot c}{2\pi}$	$\frac{e^2}{4\pi \cdot \varepsilon_0 \cdot \alpha}$	$\frac{\mu_0 \cdot c^2 \cdot e^2}{4\pi \cdot \alpha}$
Electro – Gravity	$N_\Omega \cdot 10^{-22} =$	$\frac{1}{\sqrt{24\alpha}}$	$\frac{m_N}{e}\cdot\sqrt{\frac{\pi}{6}\cdot\varepsilon_0 \cdot G_N}$	$\frac{c}{e \cdot r_N}\cdot\sqrt{\frac{\pi}{6}\cdot\mu_0{}^{-1}\cdot G_N}$

10.3 Worked example:

Derivation of the Mass-Frequency-Wavelength formulae for a Spherical Shell Capacitor(C) and a Torus Inductor (L):

$$C = 4\pi \cdot \varepsilon \cdot r_e = 4\pi \cdot \alpha \cdot \varepsilon \cdot r_\gamma = \frac{2\pi \cdot e^2 \cdot r_\gamma}{h \cdot c} = \frac{e^2 \cdot \lambda_\gamma}{h \cdot c} = \frac{e^2}{\hbar \cdot \omega_\gamma} = \frac{e^2}{m \cdot c^2}$$

$$L = \frac{m \cdot r_e{}^2}{e^2} = \frac{m \cdot \alpha^2 \cdot r_\gamma{}^2}{e^2} = \frac{m \cdot \alpha^2 \cdot \lambda_\gamma{}^2}{4\pi^2 \cdot e^2} = \frac{\alpha^2 \cdot \hbar \cdot r_\gamma}{c \cdot e^2} = \frac{\alpha^2 \cdot \hbar}{e^2 \cdot \omega_\gamma} = \frac{\alpha^2 \cdot \hbar^2}{e^2 \cdot m \cdot c^2}$$

$$\Rightarrow$$

$$\frac{1}{\sqrt{LC}} = \frac{\omega}{\alpha} = \frac{2\pi \cdot f}{\alpha} = \frac{2\pi \cdot m \cdot c^2}{\alpha \cdot h} = \frac{m \cdot c^2}{\alpha \cdot \hbar} \left[rad / s\right]$$

$$\sqrt{\frac{L}{C}} = \frac{\alpha \cdot \hbar}{e^2} = \frac{R_0}{4\pi} = \frac{1}{4\pi \cdot \varepsilon \cdot c} = \frac{\mu \cdot c}{4\pi} = c \cdot 10^{-7} \approx 30 \left[Ohm / rad\right]$$

10.4 The SI-natural unit for the Electric Charge (e):

The equation defining the fine structure constant can be solved for the unit electric charge (e). This reveals a fundamental and a transparent view to the nature and origin of the electric action. The Plank-Einstein Mass-Moment (M_0 = h/c) plays a central role here:

$$e = \pm\sqrt{2 \cdot \alpha \cdot \varepsilon_0 \cdot h \cdot c} = \pm\sqrt{\frac{2 \cdot \alpha \cdot M_0}{\mu_0}} = \pm 1000 \cdot \sqrt{\frac{5 \cdot \alpha \cdot M_0}{\pi}} = \pm 1000 \cdot e'$$

A constant (1000) appears whose physical unit is Coulombs per Square root of Mass-Moment. This simple constant supports the definition of a new fundamental charge (e') whose physical unit is a Fractional Power of Mass-Moment. The constant (1000) is eliminated by the redefinition of the either Coulomb charge, or the Kilogram mass. The latter is suggested because the Kilogram is in fact 1000 grams and therefore not a fundamental SI-unit in the strictest sense of the word. If we take the milligram as the fundamental unit mass, Planck's constant becomes "h'=6.62606876x10^{-28} [mg m^2 /s]".

A further view in SI-units is provided by the geometric fine structure constant from (ref).

$$\alpha^{-1} = \frac{32 \cdot \pi^3}{9} \cdot \left(\frac{15}{2 \cdot \pi}\right)^{\frac{1}{4}}$$

After a little algebra we arrive at the geometric formula for the elementary charge:

$$e = \pm\left(\frac{2^5 \cdot 3^7 \cdot 5^{27}}{\pi^{15}}\right)^{\frac{1}{8}} \cdot \sqrt{\frac{h}{c}} \approx \pm 107.768688 \cdot \sqrt{M_0}$$