$$\frac{2.267061\text{grams}}{1.39{\times}10^{24}} \approx \frac{\frac{c\ T_{SI}}{L_F} M_F}{1.39{\times}10^{24}} = \sqrt{\frac{k_e^2\ q_e^4\ T}{c\ G\ M\ L^2}} = \sqrt{\frac{c\ \alpha^2\ \hbar^2\ T}{G\ M\ L^2}} = M_F$$

March 29, 2022

Some CFD software uses planck units to reduce computation by reducing the billions of multiplications of k_b; we should care about people as much as machines and reduce the constants people have to know. $M_F^W L_F^X T_F^Y Q_F^Z =$

$$\left(\sqrt{\frac{c\ \alpha^2\ \hbar^2\ T}{G\ M\ L^2}}\right)^W \left(\frac{G}{c^2} M_F \frac{M\ L^2}{\alpha^2 \hbar\ T}\right)^X \left(\frac{G}{c^3} M_F \frac{M\ L^2}{\alpha^2 \hbar\ T}\right)^Y (q_e)^Z$$

$$k_e = \alpha\ M_F^1 L_F^3 T_F^{-2} Q_F^{-2} \qquad \hbar = 1\ M_F^1 L_F^2 T_F^{-1}$$
$$\mu_0 = \alpha\ 4\ \pi\ M_F^1 L_F^1 Q_F^{-2} \qquad c = 1\ L_F^1 T_F^{-1}$$
$$\epsilon_0 = \frac{1}{\alpha\ 4\ \pi}\ M_F^{-1} L_F^{-3} T_F^2 Q_F^2 \qquad N_A = 1^{**}$$
$$M_F\ c^2 = E_F = 1\ M_F^1 L_F^2 T_F^2$$
$$R_\infty = \frac{m_e}{M_F} \frac{\alpha^2}{4\ \pi}\ L_F^{-1} \qquad \frac{2\ \pi\ \hbar}{c\ q_e} = k_b = 2\pi\ M_F^1 L_F^1 Q_F^{-1}$$

1 Dimensionality

Stoney-Mass $M_S = \sqrt{\frac{\hbar\ \alpha\ c}{G}}$ units are correct, but with $M_F = M_S \sqrt{\hbar\alpha}$ alone gives correct arithmetic; for all the equations above to not only work arithmeitc wise, $\sqrt{\frac{T}{M^1 L^2}}$ is needed to cancel any wrong units put into M_F from $\hbar$. M, L, and T with no subscripts are meant to mean from whichever unit system you are converting from, in this case; SI units 1kg, 1m, and 1s respectively.

$$\alpha^2 \hbar = \alpha^2 \frac{M_F L_F^2}{T_F} = \frac{G}{M_F^3 L_F^{-1} T_F^{-2}}$$

but it comes back in the solution for G. However G is wrong to begin with, because with Relativity it doesn't really exist, as it is the curvature of space time.

$$\frac{\mu_0}{2} = \frac{\hbar\ \alpha}{c\ q_e^2};\ \ \frac{\hbar\ \alpha}{c\ q_e^2} \frac{c^2}{2\pi} = k_e;\ \ \epsilon_0 = \frac{1}{\mu_0 c^2}$$

$$\frac{\mu_0}{2} \frac{c\ q_e^2}{2\ \pi\ \hbar} = \frac{2\ \pi\ 10^{-7}\ 299792458\ (1.602176634 \times 10^{-19})^2}{6.62607015 \times 10^{-34}} = \alpha$$

$= 0.00729735257$ "It has been a mystery ever since it was discovered more than fifty years ago, and all good theoretical physicists put this number up on their wall and worry about it."[Feynman, 1985, p. 129]. **Let's put it everywhere.**

2 Speed of Sound = c_0

Given $c_0 = \sqrt{\frac{\gamma_0 N_A k_B T}{M}}$ and $39.947 g\ mol^{-1}$ = molar mass of the argon gas from the experiment measuring c_0 in a purifed isotope of argon gas at the Triple-Point of water = 273.16K [dePodesta et al., 2013] Where $U_F = \frac{E_F}{k_b}$, $T = \frac{Kelvin}{U_F} U_F$, and $\gamma_0 = 5/3$ for monotonic gases. Let's see how that matches up with the $c_0^2 = 94756.245 m^2 s^{-2}$ from the experiment in 2013. e.g. on how to correct N_A being based on the Dalton = $\frac{1}{12}$ the mass of Carbon isotope C^{12} over to M_F

$$^{**}\text{adjusted argon gas molar mass} = 40.671 M_F = \frac{39.947 kg}{M_F\ N_A}$$

$$c_0 = \sqrt{\frac{\frac{5}{3}\ 1\ k_B\ \frac{273.16 Kelvin}{U_F}\ U_F}{40.671 M_F}} = 307.701 ms^{-1} \approx \sqrt{c_0^2}$$

3 Time is On Our Side(& Distance)

With a Sympathetic Constant = D_C = light-second / L_F to save our wallets, watches, measuring wheels, and road signage we can still use existing definitions of distance and time. Perhaps one day for the sake of simplicity, Bureau international des poids et mesures might redefine the second and meter such that D_C is exactly 1.39×10^{24} rather than approx. 5 almost 6 nines.

$$\frac{1.3899982 \times 10^{24} \approx \frac{c\ T_{SI}}{L_F} = D_C}{1.39 \times 10^{24}} = 0.999998675$$

Calibrating scales to $D_C M_F$ and ammeter to $D_C q_e$ will result in the following:

$$T_F \approx \frac{1\text{Second}}{1.39 \times 10^{24}} \qquad L_F \approx \frac{299792458\text{Meters}}{1.39 \times 10^{24}}$$
$$M_F \approx \frac{2.267061\text{grams}}{1.39 \times 10^{24}} \qquad Q_F \approx \frac{222702.26\text{Coulumbs}}{1.39 \times 10^{24}}$$

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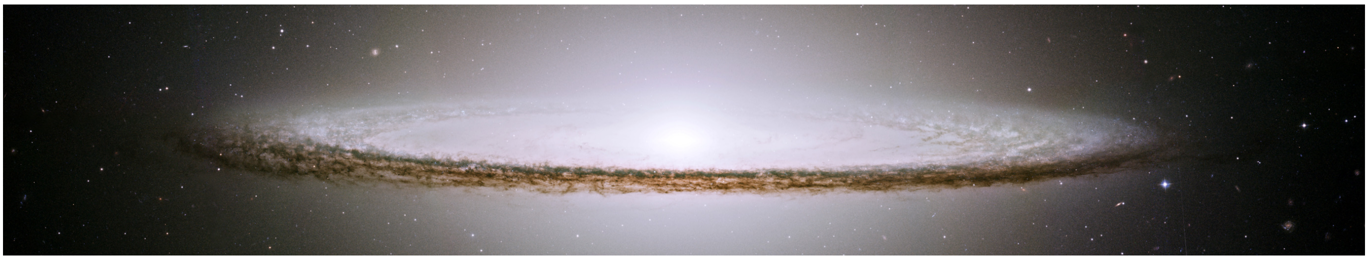

4 Constants

$$
\begin{aligned}
\text{Avogadro constant } N_A &= 6.02214076 \times 10^{26} \frac{\text{atoms per kg}}{\text{molar mass}} \\
\text{Planck constant } h &= 6.62607015 \times 10^{-34} kg\ m^2\ s^{-1} \\
\text{lightspeed constant } c &= 299792458\ m\ s^{-1} \\
\text{electron charge } q_e &= 1.602176634 \times 10^{-19} \text{Coulumbs} \\
\text{gravity constant } G &= 6.67430 \times 10^{-11} kg^{-1} m^3 s^{-2}
\end{aligned}
$$

On May 20, 2019 the values of N_A, $\hbar = \frac{h}{2\pi}$, and h, were fixed to the Dalton $= \frac{1}{12}$ the mass of Carbon isotope C^{12} [Bettin]. $s =$ "duration of 9192631770 periods of the radiation corresponding to the transition between the two hyperfine levels of the ground state of the cesium 133 atom"[SI, 1968] to finish the definition of c, An international agreement in Paris on Oct. 20 1983 defines the meter as $\frac{1}{299792458}$ the distance light travels in a vacuum in 1 second[Times, 1983],

[Tiesinga et al., 2021] gives us q_e, and G. Just don't forget Milikan's Oil Drop or the Cavendish Mitchell Device.

4.1 How the Avogadro constant was measured for the last time

N_A and h were measured using a incredibly round & pure ball of Si^{28} and a Kibble balance and the equations basically verbatim from [Bettin]Where $\alpha^2\ m_e\ c\ /\ 2\ h\ =\ R_\infty$ is the Rydberg constant, $\sum_{i=28}^{30} x_i\ A_r({}^iSi) = A_r(Si)$ average molar mass of a silicon atom in the crystal is calculated using the proportions x_i of the various isotopes ${}^iSi$, V is Volume of Silicon Sphere, a Lattice parameter of the silicon crystal, 8 is the number of atoms in an elementary cell of the lattice(cube with edge length a). M Molar mass of silicon contained in sphere. m mass of sphere.

$$N = \frac{8\ V}{a^3} = \text{Number of atoms in silicon sphere}$$

$$N_A = \frac{M\ 8\ V}{m\ a^3} = \text{Avogadro constant}$$

$$m(Si) = \frac{m}{N} = \frac{m\ a^3}{8V} = m(e)\frac{A_r(Si)}{A_r(e)}$$

$$m(e) = \frac{2\ h\ R_\infty}{c\ \alpha^2} = \frac{2\ (2\pi\ \hbar)\ R_\infty}{c\ \alpha^2}$$

$$h = \frac{c\ \alpha^2}{2R_\infty}\frac{m\ a^3}{8\ V}\frac{A_r(e)}{\sum_{i=28}^{30} x_i\ A_r({}^iSi)}$$

References

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Supplementary Materials

Only reason I found this was for some reason or another I had just looked at $\sqrt{\hbar\alpha}$, and I had Avogadro constant for Stoney-Mass $M_S = \sqrt{\frac{\hbar\ \alpha\ c}{G}}$ mass popping up in a script I had running with some notes to see how the Planck-Units, and the Stoney-Units[Stoney, 1883], baked out the need for certain constants. But when I had left the speed of sound calc to see how the planck units canceled out the Boltzman constant, and the Avogadro constant for M_S also popped up, not exact match but so close I had to do more tests.

$$\frac{2.267061\text{grams}}{1.39\times10^{24}} \approx \sqrt{\frac{k_e^2\ q_e^4\ T}{c\ G\ M\ L^2}} = \sqrt{\frac{c\ \hbar^2\ \alpha^2\ T}{G\ M\ L^2}} = M_F$$

$$\frac{\hbar}{c^2 M_F} = T_F \approx \frac{1\text{Second}}{1.39\times10^{24}};\quad Q_F \approx \frac{222702.257\text{Coulumbs}}{1.39\times10^{24}}$$

$$\frac{\hbar}{c M_F} = L_F \approx \frac{299792458\text{Meters}}{1.39\times10^{24}}$$

$$k_e = \alpha\ M_F^1 L_F^3 T_F^{-2} Q_F^{-2} \qquad \hbar = 1\ M_F^1 L_F^2 T_F^{-1}$$

$$\mu_0 = \alpha\ 4\ \pi\ M_F^1 L_F^1 Q_F^{-2} \qquad c = 1\ L_F^1 T_F^{-1}$$

$$\epsilon_0 = \frac{1}{\alpha\ 4\ \pi}\ M_F^{-1} L_F^{-3} T_F^2 Q_F^2 \qquad N_A = 1^{**}$$

$$M_F\ c^2 = E_F = 1\ M_F^1 L_F^2 T_F^2$$

$$R_\infty = \frac{m_e}{M_F}\frac{\alpha^2}{4\ \pi}\ L_F^{-1} \qquad \frac{2\ \pi\ \hbar}{c\ q_e} = k_b = 2\pi\ M_F^1 L_F^1 Q_F^{-1}$$

$$\frac{\hbar}{c^2 M_F} = T_F \approx \frac{1\text{Second}}{1.39\times10^{24}};\quad Q_F \approx \frac{222702.257\text{Coulumbs}}{1.39\times10^{24}}$$

$$\frac{\hbar}{c M_F} = \frac{1.39\times10^{24} L_F}{299792458} \approx 1\text{Meter}$$