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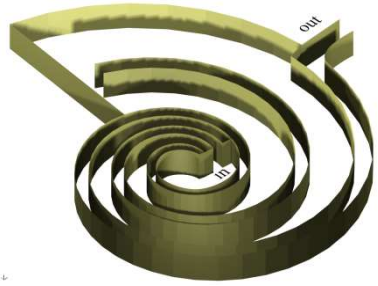

EX SPIRA AQUA MUNDA

In memory of my son Giovanni

8-Jan-19

To my wife FRANCESCA

and my daughter AMANDA

To review Summary: How to get A. Avogadro's constant N_A from the measurement of the Speed of Light and vice-versa, how to get the value of the speed of light from the "gravitational experiment measuring A. Avogadro's N_A".

The 1811 was the year when A. Avogadro claimed the existence of a constant number N_A of entities (molecules H_2O in Gas status) at STP in a fixed volume, called "mole" and presented the "mole" as part of the unit of volume $1[m^3]$:

$$1\text{"mole"} = \frac{\sqrt[2]{500}}{1000} = 0.022360679..[m^3]$$

According to A. Avogadro, each of said entities H_2O in status of Gas were supposed to be contained inside a fixed volume of reference $1[m^3]$ at STP and the single volume that it occupies, here, is named:

"Space Fabric of the H_2O" or SF_{H_2O-Gas} .

The number of these entities H_2O inside 1"mole" is a constant named N_A (Avogadro constant) and results that since inside $1[m^3]$ there are:

$$\frac{1}{0.022360679.} = 44.7213611..\text{"}mole\text{"}$$

The number N_M of entities (H_2O in status di Gas) inside the unit of volume $1[m^3]$ has to be:

$$N_M = \frac{N_A}{1\text{"}mole\text{"}} = \frac{N_A}{0.022360679} = \frac{N_A \cdot 44.7213611..}{[m^3]}$$

For each of them consequently the number of volumes of the Space Fabric containing an entity of Gas SF_{H_2O-Gas} inside the volume $1[m^3]$ is:

$$SF_{H_2O-Gas} = \frac{1}{N_M}\ [m^3]$$

More than 50 years went through until J. Loschmidt obtained (through laboratory research) a value N_M for a molecule of

which I have no record but necessarily had to be H_2O in status of Gas.

J. Loschmidt in the Year 1865 determined, with reasonable approximation, the number of entities occupying a volume SF_{H_2O-Gas} contained inside $1[cm^3]$ that is also extended here below to the volume $V = 1[m^3]$:

$$\widetilde{N_M} = \frac{2.69e^{19}}{[cm^3]} = \frac{2.69e^{25}}{[m^3]}$$

A result reasonably close to the one more accurate which is accepted nowadays (see below).

It is to be noted that from the above $\widetilde{N_M}$ can be derived an approximated value of $\widetilde{N_A}$:

$$\widetilde{N_A} = \widetilde{N_M} \cdot 0.022360679 \cong 6.0150251e23$$

The consequence was that through $\widetilde{N_M}$ became possible to calculate the value of Space Fabric SF_{H_2O-Gas} containing a single item (molecule H_2O in status of homogeneous Gas):

$$\widetilde{SF_{H_2O-Gas}} = \frac{1}{\widetilde{N_M}} = 3.717472119..e^{-26}\ [m^3]$$

In my paper: (Google)

January 9, 2019: MICROCOSMO- la Legge dei Gas di A. Avogadro's e gli Atomi-mol... view

January 9, 2019: MICROCOSM- the Gas Law of A. Avogadro's and the Atoms-Molecul... view

Was presented the concept that there is Analogic correspondence of formulations between Macrocosm and Microcosm as is the case now that in the Macrocosm the cube of the gravitational depression: $\bar{\bar{\varepsilon}}(R,\rho)^3 = \left(\frac{\frac{k}{3}\rho_{LGM}R_{LGM}^2}{c^2}\right)^3$ in the unit of volume is in Analogic correspondence with the volume of Space Fabric SF_{H_2O-Gas} (c^3 of whom are allocated, also in the unit of volume $1[m^3]$, according to A. Avogadro's Law) and

inside each of these volumes is contained the molecular entity H_2O in Gas status:

$$SF_{H_2O-Gas} = \left(\frac{1}{c}\right)^3 \cong \frac{1}{(3e^8)^3} = \frac{1}{2.7e^{25}} = 3.7037e^{-26}[m^3]$$

Demonstration:

The Ruggeri's General Gravitational Formula of Universal Dissipation in the Macrocosm calculating the OUTPUT in $\left[\frac{kJ}{1"}\right]$ coming out of a gravitational mass of which is known the density and the radius $(\rho_{LGM,}R_{LGM})\ is$:

$$OUTPUT = \left(\frac{v(R_{LGM},\rho_{LGM})^2}{c^2}\right)^3 \cdot \left(\frac{2\pi \cdot c^4}{k}\right)\left[\frac{kJ}{1"}\right]$$

Showing that as a formula reducible to a canonical:

$$F(x) = x^3 \cdot const$$

Is a formula in Analogic correspondence with the formula containing A. Avogadro's constant value:

$$(1"mole" = 0.00223606\ldots):$$

$$N_A = c^3 \cdot (0.00223606\ldots)$$

** We intend now calculate with precision the correspondence between the speed of light (measured directly) in the Macrocosm and the Analogous value in the Microcosm, therefore we must start with Avogadro's constant N_A characterizing the number of entities contained inside the volume of "one mole":

$$\mathbf{1\ "mole"} = \frac{\sqrt[2]{500}}{1000} = \mathbf{0.02236067977}\ [\boldsymbol{m^3}]$$

Using the "accepted" value of the speed of light <u>as measured in the Macrocosm at present</u>:

$$\boldsymbol{c_{Macrocosm}} = \mathbf{299792458}\ \left[\frac{\boldsymbol{m}}{\mathbf{1"}}\right]$$

We obtain a cubic value:

$$\boldsymbol{N_{M-Macr} = c_{Macrocosm}{}^{3} = 2.694400242e^{25}}$$

The above formula permits us to deduct an Analogic correspondent value for

A. Avogadro's constant $\boldsymbol{N_{A-Macr}}$:

$$\boldsymbol{N_{A-Macr} = N_{M-Macr} \cdot (1"mole") =}$$

$$= 2.694400242e^{25} \cdot 0.02236067977 = \boldsymbol{6.024862098e^{23}}$$

Whereas using the number N_{A-Micr} of entities $(H_2O\ Gas)$ inside a fixed volume of $1m^3$ at STP (obtained for the Microcosm, through the most advanced methods of research at present times):

$$\boldsymbol{N_{A-Micr} = 6.022140857e^{23}}$$

The product of this last value of entities for the number of moles inside the unit of volume $V = 1[m^3]$ gives us constant:

$$N_{M-Micr} \text{ at STP inside } V = 1[m^3]$$

$$N_{A-Microcos} \cdot \frac{1}{(1"mole")} =$$

$$N_{A-Microcosm} \cdot 44.72135956 = 2.693183266e^{25}$$

Each entity H_2O occupying a volume of Space Fabric

$$\boldsymbol{V_{SF-H_2O-Gas} = \frac{1}{2.693183266e^{25}} = 3.713078173e^{-26}[m^3]}$$

From which we deduct the length of the side of the cube of volume V_{SF-H_2O-Gas} :

$$\frac{1}{c_m} = \sqrt[3]{3.713078173e^{-26}} = 3336.143311\ (pm)$$

Corresponding to a number of divisions of the unit of length $1[m]$:

$$c_{Microcosm} = \frac{1}{3336.143311e^{-12}} = \boldsymbol{299747315[m^{-1}]}$$

Note: the above c_m can also be obtained in the following manner:

$$\boldsymbol{c_{Microcosm}} = \sqrt[3]{N_{M-Micr}} = \sqrt[3]{2.693183266e^{25}} =$$
$$= \mathbf{299747315}[\boldsymbol{m^{-1}}]$$

$\boldsymbol{c_{Microcosm}}$ as the number of partitions of the length of $1m$ in the Microcosm in Analogic exact correspondence with the speed of light in the Macrocosm as can be checked with the measured value in acceptance at present day (see above):

$$c_{Macrocosm} = 299792458 \left[\frac{m}{1"}\right]$$

The numeric discrepancy between the two entities, the measured one in the Macrocosm and the analogous correspondent in the Microcosm, obtained measuring the A. Avogadro's constant N_{A-Micr} is:

$$\Delta = \frac{299792458-299747315}{299792458} \cong 0.00015 \approx \frac{1.5}{10000}$$

Note: up to present, in all calculations, in order to avoid unnecessary complications, for c (the speed of light) I always used a standard value (both in the Macrocosm and in the Microcosm) $c = 3e^8$ since it is a value easier to use in many formulations and has a minimal discrepancy with the measured ones (see above: the first obtained directly using the measured speed of light and the other obtained, indirectly, through an accurate measurement of A. Avogadro's constant).

Ex: for what regards the extreme value c^5 contained inside the OUTPUT=INPUT formulation of the Ruggeri condition:

$BH_{Sch-} = \frac{2\pi \cdot c^4}{k} = \frac{c^5}{40} = 6.075e^{40} \left[\frac{kJ}{1"}\right]$:

1) In respect of the:

$$c_{Macrocosm} = 299792458$$

(Measured directly-See above) we have the following discrepancy:

$$1-\left(\frac{299792458}{3e^8}\right)^5 = 1-.99645..= 0.00345 \cong \frac{3.45}{1000}$$

2) In respect of the:

$$c_{Microcosm} = 299747315\ [m^{-1}]$$

Obtained indirectly from the currently accepted A. Avogadro's constant (see above):

The discrepancy is:

$$1-\left(\frac{299747315}{3e^8}\right)^5 = 1-.99579..= 0.00420 \cong \frac{4.20}{1000}$$

The consequences and conclusions associated to this "Analogic Discovery" are of very interesting nature and will be presented in future.

(English)