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Dissipation Part 1

Gas Giants, (Rigel, Betelgeuse, Aldebaran etc..), Determination of mass values and densities through the use of formulations belonging to the UDS

The application of formulations belonging to the UDS permits a dramatic advancement in the description of the Universal reality.

When I came across the evaluation of the important category of stellar masses commonly called gas giants an unusual feature came to my attention, since the reported mass values of these stars were suspiciously very low when compared to the amounts of energy coming out of them.

Presently, the evaluation of some physical data regarding stellar objects depends from the instrumentation available to the Astronomers-Scientists, which then (when possible) deduct through hypotheses and formulations the unknown values of other data.

This system works but undoubtedly is flawed since when a solid theory is not available the unknown values deducted can be subjected to wild work of imagination.

This seems to be the case for the stars close to us (whose distance in Year light can be reliably measured through the parallax) since for them we can *measure with a good degree of approximation* many data out of which those in this paper that are of interest to us, are the radius of the star $\mathbf{R_{Star}}$, the measured **L**uminosity (i.e. the amount of dissipation in kW coming out of their surfaces), and the surface temperature **T°**.

The available (empirical) formula binds the surface temperature $T°_{Star}$ to the measure of Luminosity of a Star "L_{Star}" (*given as the whole amount of surface dissipation of a Star as evaluated by the observer*) and to the radius R_{Star} in the following manner:

$$1) \quad T°_{Star} = \sqrt[4]{\frac{L_{Star}}{4\pi R_{Star}^2 \sigma}}$$

where σ (is the Stefan-Boltzmann constant) :

$$\sigma = 5.67e\text{-}11 \text{ kW m}^{-2} \text{ °K}^{-4}$$

Both R_{Star} and L_{Star} , are the necessary values, from which we deduct T° with the use of the 1 above.
Note: provided that the distance is not very high, the radius R_{Star} can be measured with a method using the parallax, and the L_{Star} is measured directly through very sensitive electrical equipment.

A problem arises when we try to determine the mass values of these stars (close enough to us) since we are bound to formulate hypotheses regarding the transformations-degradations taking place inside them, the priority should be given to internal transformations-degradations of gravitational origin whose physical values in kW are expressed in function of the Mass of the object observed.

Note: in order to determine the mass of a star, what in reality we need is its density (ρ_{Star}) since, as mentioned, (if the star is not very distant) we *can measure* (with a good approximation) its diameter ($2R_{Star}$) and therefore its volume.

To start with, the knowledge of a Luminosity value (L_{Star}) obtained using methods comparing it to L_{Sun} or expressed as a value of real dissipation in kW coming out of a Star of which we know only the radius R_{Star} gives us only the value of surface temperature $T°_{Star}$ but tells us little about the essential information which is the density (ρ_{Star}).

I have no knowledge regarding the methods currently used to obtain the density of the star under examination but when I read the values presently given for their masses and their radiuses, I had doubts about their reliability (below I quote just a few of them) taking into account that the reference to the Sun is M_{Sun} = 2e27 Ton and R_{Sun} = 6.96e8 m and the measured L_{Sun}= 3.846 e23 kW:

Table 1

Star	Mass	Mass value	Radius	Luminosity

	value	calculated	measured	measured
	As published	See formulation 3) below	$R_{Star}=\zeta\, R_{Sun}$	$L_{Star}=\chi\, L_{Sun}$
Rigel	~~17~~ M_{Sun}	3150 M_{Sun}	78 R_{Sun}	66000 L_{Sun}
Betelgeuse	~~19~~ M_{Sun}	61330 M_{Sun}	1180 R_{Sun}	140000 L_{Sun}
Aldebaran	~~1.7~~ M_{Sun}	332 M_{Sun}	44.2 R_{Sun}	425 L_{Sun}
SiriusA	~~2.02~~ M_{Sun}	5.03 M_{Sun}	1.71 R_{Sun}	25.4 L_{Sun}

As one can see, in the above table I discard the values presently published and present the values obtained with my theory (UDS).
Note: the mass values given in the above table will be justified below through calculations of gravitational formulations.

In the paper ruggeri8 is presented a formula (obtained using *a theory strictly based on gravitational phenomena of transformation-degradation*) **calculating the total value of dissipation out of the solar mass in kW** and in equivalent mass-energy ΔM_{Sun} [Ton/sec] we have:

$$E_{Sun} = 5.87\text{ e}23\ \text{kW} \rightarrow \text{equivalent to } \Delta M_{Sun} = 6.52\text{ e }6\ \text{Ton/sec}$$

Note: E_{Sun} as mentioned above is total dissipation generated by internal gravitational process (since the formula used to get E_{Sun} is comprising all the internal transformations-degradations due to gravity that should be coming out as energy output, along the complete spectrum, visible and invisible and is calculated) whereas Luminosity L_{Sun} = 3.846 e23 kW is the value that presently we manage to measure using our instruments ..
Here, in the following demonstrations, I will use the $\mathbf{E_{Sun}}$ since it *represents a calculated value based on my theory*, it comprises the entire value of the gravitational transformation-degradation from neutron m-e to Heat (energy) output and as such will be compared with the value L_{Sun} directly measured.

We then have that *applying to a Star* the formulation of the UDS, (see Ruggeri8):

$$k_{el-Star} = a(R_{Star})\,\frac{v(R_{Star})_0^2}{2\cdot c^2} = \frac{1}{2}\,\frac{k\cdot M_{Star}}{4\pi R_{Star}^2}\cdot\frac{k\cdot M_{Star}}{4\pi R_{Star}\, c^2}$$

We obtain the value of dissipation:

$$2)\quad E_{Star} = k_{el-Star} M_{Star}\,[kW]$$

where k=8.3855e-7= $4\pi G$; $\mathbf{R_{Star} = \zeta\, R_{Sun}}$ and where the ratio χ between the dissipation of a star (E_{Star}) and the dissipation of the Sun E_{Sun} (of which only E_{Sun} is directly calculated) is equal to the ratio between the measured value of the Luminosity of the Star and the measured Luminosity of the Sun:

$$\frac{E_{Star}}{E_{Sun}} = \frac{L_{Star}}{L_{Sun}} = \chi$$

Note: $E_{Sun} \cong 1.53\ L_{Sun}$

The 2) above containing the unknown value M_{Star} becomes:

$$M_{Star} = \sqrt[3]{E_{Star} R_{Star}^{3} \cdot \frac{(4\pi)^{2} \cdot 2 \cdot c^{2}}{k^{2}}}$$

Since also the 2 applied to the Sun becomes:

$$E_{Sun} = k_{el-Sun} \cdot M_{Sun}$$

$$M_{Sun} = \sqrt[3]{E_{Sun} R_{Sun}^{3} \cdot \frac{(4\pi)^{2} \cdot 2 \cdot c^{2}}{k^{2}}}$$

The ratio of these two expression gives (the puzzling) simple result:

$$\frac{M_{Star}}{M_{Sun}} \approx \frac{R_{Star}}{R_{Sun}} \sqrt[3]{\frac{E_{Star}}{E_{Sun}}} = \frac{R_{Star}}{R_{Sun}} \sqrt[3]{\frac{L_{Star}}{L_{Sun}}} = \zeta \sqrt[3]{\chi}$$

It represents an **Universal Law belonging to the UDS** *which can be also more simply written in the following manner:*

$$3) \quad \frac{M_{Star}}{M_{Sun}} \approx \zeta \cdot \sqrt[3]{\chi}$$

showing that gravity is the <u>basic Universal phenomenon from which every transformation-degradation depends</u> since from a geometric ratio of the radiuses and from a cubic root of the ratio of energies of dissipation belonging to two gravitational masses, both obtained through physical measurements, we get the ratio of two gravitational masses observed one of which (in this case the mass of the Sun), is known, since has been obtained through the ULG (Newton's Law). From the knowledge of the value of the Solar mass, its radius and Luminosity and the radius and Luminosity of the Star observed, we then have deducted the basic Law valid in the entire observable Universe, permitting us to gain the mass value of a Star (belonging to a class in which the gravitational transformation-degradation prevails).

The exercise

We use the star Aldebaran as example (then we also calculate the mass value of the other stars) :

It has χ = 425 and ζ = 44.2 (both measured, see table 1 above)

Substituting them in the above formulation we get the mass value of Aldebaran:

$$M_{Aldeb} = 44.2 \cdot \sqrt[3]{425}\ M_{Sun} \approx 332 \cdot M_{Sun}$$

A value far higher of the one attributed to Aldebaran and in use at present ~1.7 M_{Sun} that since Aldebaran has a volume: ζ^3 V_{Sun} *presumes a dubious value of absolute density*:

$\rho_{ABS\text{-}Aldeb}$ = ~~0.00002788~~ Ton/m^3

or of relative density $\rho_{Rel\text{-}Aldeb}$ = ~~0.00001975~~ ρ_{Sun}

Once the above *gravitational* expression in 2 and the consequent Universal Law in 3 are accepted, the average absolute density of Aldebaran can be obtained:

$$\rho_{ABS-Aldeb} = \frac{M_{Aldeb}}{V_{Aldeb}} = \frac{332 \cdot M_{Sun}}{\zeta^3 \cdot \frac{4}{3}\pi R_{Sun}^3} = 0.00545 \left[\frac{Ton}{m^3}\right]$$

From which:

$$\rho_{Rel-Aldeb} = \frac{\sqrt[3]{\chi}}{\zeta^2} \cdot \rho_{Sun} = 0.00385\ \rho_{Sun}$$

Table 2

Star	Mass value used in Scientific Publications	Mass value Calculated with gravitational UDS formulations	Absolute value of Density or density relative to $\rho=1$ Ton/m^3 which is the density of the Ether/ESF	
	As published	See formula above		
Rigel	~~17~~ MSun	3150MSun	0.0094	Ton/m^3
Betelgeuse	~~19~~ MSun	61330MSun	0.0000546	Ton/m^3
Aldebaran	~~1.7~~ MSun	332MSun	0.00545	Ton/m^3
SiriusA	~~2.02~~MSun	5.03MSun	1.424	Ton/m^3

Values of mass calculated result a far cry away from those in use now, as shown in the above table, (for Rigel, Betelgeuse, Aldebaran and SiriusA) as

confirmation that the values obtained are exact we must notice that from a value of Luminosity L_{Star} (dissipation $E_{Star} \cong 1.53\ L_{Star}$) obtained measuring the temperature at the surface of the Star and of R_{Star} measured directly we have obtained the value of M_{Star} and reconnected that value to M_{Sun} through gravitational formulations belonging to the UDS which is a theory considering the action of gravity inside the gravitational mass and attributing to gravity all the transformations-degradations taking place inside it:
Since $L_{Star} = \chi\ L_{Sun}$ and $R_{Star} = \zeta\ R_{Sun}$ are values observable, the calculation of the temperature at the surface of a star (Aldebaran in our case) using the formula 1 uses the same ratio χ obtained in 3 through calculations:

$$T° = \sqrt[4]{\frac{L_{Aldeb}}{4\pi R_{Aldeb}^2 \sigma}} = \sqrt[4]{\frac{425 \cdot 3.84e23}{4\pi \cdot (44.2 \cdot 6.96e8)^2 \cdot 5.67e^{-11}}} = 3944°\ K$$

A value definitely corresponding to the temperature T°= ± 3950 °K measured directly.

Note: the above value of temperature is obtained using the ratio χ measured but we must bear in mind that once known the mass values the χ can also be calculated with the 3.

The above formula can also be written in the following manner:

$$T° = \sqrt[4]{\frac{E_{Aldeb}}{4\pi R_{Aldeb}^2 \sigma}} = \sqrt[4]{\frac{\chi \cdot 5.87e23 / 1.53}{\zeta^2 4\pi \cdot (6.96e8)^2 \cdot 5.67e^{-11}}} = \sqrt[4]{\frac{\chi}{\zeta^2}}\, T_{Sun} [°K]$$

Applying the 1) to the Sun surface we have:

$$T°_{Sun} = 5770\ °K$$

$$T°_{Star} = \sqrt[4]{\frac{\chi}{\zeta^2}}\, T°_{Sun}$$

For the group of stars considered above the surface Temperature in degrees Kelvin are:

	Surface Temperature °K
Rigel	10470
Betelgeuse	3250
(*) Aldebaran	3940
Sirius A	9905

Consequences

The theory used presently suggest a value of internal transformation-degradation in excess, based on presence of atomic transformation-degradation from Hydrogen to Helium and is an undeniable fact that these transformations-degradation take place (since that is the mechanism through which the mass M_{ESCM} which is represented by the glue holding together the neutronic mass (neutron and protons inside the star) undergoes transformation-degradation into M_{Heat} (and eventual dissipation when M_{Heat} reaches the surface of the Star).

Nevertheless gravity is at the base of every transformation-degradation inside a mass subject to it and there are no exceptions, since the difference of internal reactions due to gravitational process and consequent dissipation is only determined by the size and the status of the mass (in Ruggeri14 table 1 are shown the amounts of internal transformation-degradation of gravitational origin for the Sun and for most of the planets of the Solar System).

Obviously if we consider a mass small enough (an asteroid for example, the internal transformation-degradation due to gravity, and consequent dissipation, can be overlooked, as a matter of fact the dissipation coming out of Earth is 3.9e-2 kW/m^2 (or 39÷40 W/m^2) and from the Moon is ~5e-5 kW/m^2 (or ~0.05 W/m^2).

Note: as we can see, for Earth the internal dissipation of gravitational origin, though small, is still a considerable value, showing that inside the Earth there is at any time a considerable amount of compressed m-e M_{Heat} flowing towards its surface and continuously replaced by internal transformation-degradation.

The consequences on Earth due to internal gravitational transformation-degradation and to the dissipation received from the Sun will be dealt in a separate paper (**Dissipation Part 2**).

The fact is that the Universal formula presented above is developed through the theory considering the presence of Ether/ESF and permits to obtain through the ratio of the values of dissipation (measured or calculated) and the ratio of their radiuses (measured) the ratio of the two gravitational masses values, permitting a “modelling” of gravitational phenomena and in that way enables us to deduct from the knowledge of the gravitational mass value of the Sun, the gravitational mass value of the Star observed.

This is obtained in this paper, (see formula 3 above) through considerations based on the ULG of Newton and the Law of equivalence of Einstein due to presence in the formulations of the term c^2 etc….)