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Reassessment of the old but still employed theories of Universe through database checking

Author: Weitter Duckss (Slavko Sedic)

The goal of the article is to reassess, exclusively with the evidence from the available databases, old but nowadays dominant theories of star evolution, thermonuclear combustion (fusion) of matter needed for the heat of stars, the effect of the gas cloud collapse speed to the temperature and age of stars.

-The starting basics are that mass directly defines the temperature of a star.

Big stars / small bodies

Star	Radius Sun 1	Temperature K
S Cassiopeiae	930	1.800
CW Leonis	700	2.200

To the opposite

Star	Mass M Sun	Temperature K
2M1207	~0,025	2550 ± 150
Teide 1	0,052	2600 ± 150
VHS 1256-1257	0,07-0,015	2.620 ± 140
Van Biesbroeck's star	0,075	2.600
DENIS 1048-1039	0,075	2.200
Teegarden's Star	0,08	2.637
DX Cancri	0,09	2.840
TVLM 513-46546	0,09	2.500
Wolf 359	0,09	2,800 ± 100
Gliese 777	0,09	5.417

All stars from List of the largest stars with their radius over 700 R of Sun are having the temperatures between 1.800 and 5.100°K and are cold stars, mostly of M class.

-(big stars)/to the opposite, there is a star (planet) and brown dwarfs that are distant from their main star (100 -740 AU) and that rules out the influence of the star on the temperature of the planet or brown dwarf. (Planets shine by reflected light; stars shine by producing their own light)

Planet	**Mass of Jupiter**	**Temperature K**	**Distance AU**
GQ Lupi b	1-36	2650 ± 100	100
ROXs 42Bb	9	1,950-2,000	157
HD 106906 b	11	1.800	~650
DH Tauri b	12	2.750	330
CT Chamaeleontis b	10,5-17	2.500	440
HD 44627	13-14	1.600-2.400	275
1RXS 1609 b	14	1.800	330
UScoCTIO 108 b	14	2.600	670
Oph 11 B	21	2.478	243
HIP 78530 b	24	2.700	740

These are flagrant examples that show that an object's mass is not the one that causes different temperatures of stars or other objects and that mass is not directly related to the great differences in the objects' temperatures.
-If we look at the stars with the similar masses (0,5 do 0,7 M Sun …)

Star	**Mass Sun 1**	**Temperature K**
HD 149382	0,29-0,53	35.500±500
PG0112+104	0,5	30.000
40 Eridani B	0,5	16.500
Lacaillea 9352	0,503	3.626
L 97-12	0,59	5.700 ±90
Zeta Cygni B	0,6	12.000
Procion B	0,6	7.740
Van Maanen 2	0,68	6.220
HD 4628	0,7	5.829
G29-38	0,7	11.820
Sun	1	5.772
Sirius B	0,98	25.200
Gamma Piscium	1,03	4.885
Arcturus	1,08	4.286

ISSN 2229-5518

VX Sagittarii	12	2.400 – 3.300
Antares	12,4	3.400
E Canis Majoris	12,6	22.900
μ Columbae	16	33.000
WR 2	16	141.000
VY Canis Majoris	17	3.490
A Crucis α1	17,8	24.000
WR 102	19	210.000
WR 134	19	63.100
Deneb	19	8.525
η Canis Majores	19,19	15.000
Mu Cephei	19,2	3.750
HD 21389	19,3	9.730
WR 46	25	112.000
S Monocerotis	29,1	38.500
MU Normea	33,3	28.500
QU Normea	43	17.000
NML Cygni	50	3.834

Several examples of binary systems

Star	**Mass Sun 1**	**Temperature K**
Sirius A	2,02	9.940
Sirius B	0,978	25.200
Alpha Crucis α1	17,8+6,05	24.000
Alpha Crucis α2	15,52	28.000
Epsilon Aurigae A	2,2-15	7.750
Epsilon Aurigae B	6-14	15.000
Procion A	1,499	6.350

Procion B	0,602	7.740
Castor A	2,76	10.286
Castor B	2,98	8.842
Castor C	0,5992	3.820

When checking a database, it is found that the objects of the same mass can have completely different temperatures, ranging from stellar spectral class M to O (- WR 2, type WN4-s, 16 M Sun, temperature 141.000 K; -µ Columbae, type O, mass 16 M of Sun, temperature 33.000 K; – VY Canis Majoris, type M, mass 17 M of Sun, temperature 3.490 K).

Based on these examples of the same masses and different temperatures, it can be ruled out that thermonuclear reaction inside a star is the cause of its temperature level. Same or similar levels of mass and identical chemical composition of stars should produce the same amount of thermonuclear fusion of matter and consequently the same or similar level of temperature. These examples prove the opposite, i.e., that this is not the case.

It can be determined in the same way that the age of stars is not related to the level of temperature. Similar mass inside the gas cloud of the similar chemical composition like that of stars should abide by the same principles, mass, stellar system, identical chemical composition of the planets around that star, etc.; the examples show the failure to abide by these (or any other) rules.

-The following examples connect mass, radius and temperature.

Star	**Mass Sun 1**	**Raius Sun 1**	**Temperature K**
Bellatrix	8,6	5,75	22.000
Alnitak Ab	14 ± 3	7,3 ± 1,0	29.000
Alnitak B	16	7,2	29.000
Alnitak Aa	33 ± 10	20,0 ± 3,2	29.500 ± 1000
EZ Canis Majoris	19	2,65	89.100
AB7 WR	23	3,4	105.000
MU Normea	40	25	28.500
AB7 O	44	14	36.000
Melnick 42	189	21,1	47.300
R136a1	315	28.8-35.4	53.000 ± 3000
UY Scuti	7-10	1.708 ±192	3.365
Betelgeuse	11,6	887 ±203	3.590
VX Sagittarii	12	1.350–1.940	2.400-3.300
Antares	12,4	883	3.400

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VY Canis Majoris	17	1.420 ±120	3.490
V602 Carinae	17,7	1.050	3.432
VV Cephei A	18,2	1.050	3.826
Mu Cephei	19,2	1.260	3.750
WOH G64	<25	1.540	3.200
NML Cygni	50	1.183	3.834

If in a relation of mass/radius (Sun = 1), mass exceeds a radius, then the temperatures will be higher, and on the opposite: if a radius exceeds mass, the temperatures are lower.

-When the rotation around the axis is introduced into the analysis

„The international team found the so-called blue hook stars throw off their cool outer layers late in life because they are rotating so rapidly, making them more luminous than usual.“

The sample of the analyzed blue stars in this article consists of more than 3.700 units.

Star	**Mass Sun 1**	**Radius Sun 1**	**Temperature K**	**Rotation speed**
Arcturus	1,08	25,4	4.286	2,4 km/s
R Doradus	1,2	370± 50	2.740	340 day
HD 220074	1,2	49.7 ± 9.5	3.935	3 km/s
Kappa Persei	1,5	9	4.857	3 km/s
Aldebaran	1,5	44,2	3.910	634 day
Hamal	1,5	14,9	4.480	3,44 km/s
Iota Draconis	1,82	11,99	4.545	1,5 km/s
Pollux	2,04	8,8	4.666	2,8 km/s
Beta Ursae Minoris	2,2	42,6	4.030	8 km/s
Beta Andromedae	3-4	100	3.842	7,2 km/s
Betelgeuse	11,6	887 ±203	3.590	5 km/s
WR 102	19	0,39	210.000	120 km/s
IK Pegasi	1,65	1,6	7.000/35.000	<32,5
Alpha Pegasi	4,72	3,51	9.765	125 km/s
η Aurigae	5,4	3,25	17.201	95 km/s
Eta Ursae Majoris	6,1	3,4	16.823	150 km/s
Spica secondary	6,97	3,64	18.500	87 km/s
Spica primary	10,25	7,7	22.400	199 km/s
Gamma Cassiopeiae	17	10	25.000	432 km/s

Zeta Puppis	22,5 – 56,6	14-26	40.000-44.000	220 km/s
S Monocerotis	29,1	9,9	38.500	120 km/s
Alnilam	30-64,5	28,6-42	27.000	40-70 km/s
Alnitak Aa	33 ± 10	20.0 ± 3.2	29.000	110 ± 10 km/s

A star's rotation around the axis is related to its radius. The faster the rotation is, the smaller is the radius, i.e., the diameter of a star gets smaller with the increase of the rotation speed.

The higher speed of the rotation around its axis and smaller stellar radius are related to the higher temperatures (and higher surface gravity), and the opposite: the lower speeds of rotation enable bigger stellar diameters, lesser amounts of friction and the pressure to the surface and they also create lower temperatures.

Higher or lower stelar density is a product of the relation mass/stellar radius. There are higher and lower limits of density. Matter constantly tends to be less dense (Sun 1,408 g/cm^3); from the total amount of stars in Milky Way, 96,15% are the stars of the classes M, K and G with low temperatures, up to ~ 6.000 K. Very small, even insignificant part of them are extremely hot, hot and warm stars, 3,85% (class O making only ~0,00003%) and with the white dwarfs probably following this percentage.

It should not be recommended to reduce the analysis of the influence of factors to the stars on mass, radius, temperature and the rotation of object around the axis in this reassessment of the old theories, because an inexact impression of the statistical analysis of the other objects may occur. This article should be used only as a quick approximate tool of star positioning, as a kind of control when determining a measurement and, if there are deviations, the cause of deviations must be determined or the measurement should be repeated.

Temperature and radiance are also affected by the tidal forces from the bigger or smaller binary effect, environment, the density of gas (layers) between the observer and a star, the speed of outer matter influx to the object, especially into a whirl or cyclone on the poles of a star (over 140 tons of space matter is falling daily to the surface of Earth), different sums of the mass and rotation effects to the small and big stars.

If we check the data of the objects' masses, we can see that independent objects with a bigger mass have a higher temperature, but the level of temperature is limited (**S Cassiopeiae** 3,5-10 M Sun, Radius 930 R Sun, Temperature 1.800 K) and it is more notable in smaller objects, which are in the phase of melting and changing into a star. ..

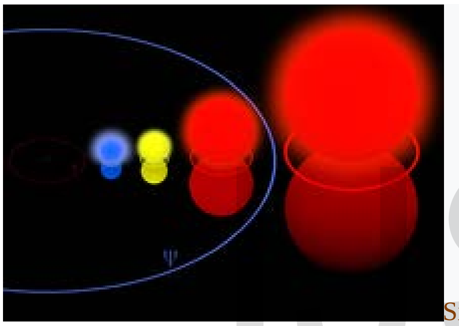
Databases used here: Wikipedia, Wikiwand, exoplanet.eu, openexoplanetcatalogue and other sources used by these encyclopedias etc. 27.04.2017. g.

Traslated by: prof. Zoran Coso zcoso@unizd.hr

Continued, additional links. 03.05.2017. y.

Can we believe in data of measurements?

„Dysnomia, the moon of Eris, is beyond our abilities to acquire data in a credible way (that is obvious when talking about the less distant object of Haumea), but it should not be forgotten that nowadays scientists introduce, with "a high probability“, "relevant“ data for the exoplanets that are tens and thousands of light-years away. Therefore, the measurements are unreliable and should be treated as such, i.e., with caution.“ http://www.svemir-ipaksevrti.com/Universe-and-rotation.html#working-temperatures-of-elements


Size and mass of very large stars: Most massive example, VY Canis Majoris (17 ± 8 $M_\odot$). Others are Rho Cassiopeiae (14-30 $M_\odot$), Betelgeuse (11.6 ± 5.0 $M_\odot$), and the blue Pistol Star (27.5 $M_\odot$). The Sun (1 $M_\odot$) Wikipedia

"A Beautiful Example" of Mathematics and Logic! Great mass has a small volume and vice versa. No wonder what about the density circulating fairy tale.

Type	Density [kg/m³]
Basalt **magma**	2650–2800
Andesite magma	2450–2500
Rhyolite magma	2180–2250

„Estimates of average density for the upper **crust** range between 2.69 and 2.74 g/cm^3 and for lower crust between 3.0 and 3.25 g/cm^3, Sun 1,408 g/cm^3“ Wikipedia

Increasing temperature decreases the density.

Quotations from Wikipedie

White dwarfs resist gravitational collapse primarily through electron degeneracy pressure. (By comparison, main sequence stars resist collapse through thermal pressure.)

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The Chandrasekhar limit is the mass above which electron degeneracy pressure in the star's core is insufficient to balance the star's own gravitational self-attraction. Consequently, white dwarfs with masses greater than the limit would be subject to further gravitational collapse, evolving into a different type of stellar remnant, such as a neutron star or black hole. (**However, white dwarfs generally avoid this fate by exploding before they undergo collapse**.) Those with masses under the limit remain stable as white dwarfs.

-The currently accepted value of the limit is about 1.4 $M_{\odot}$.

Sirius B

This mass is packed into a volume roughly equal to the Earth's (**radius 0,0084 ± 3% $R_{\odot}$**). The current **surface temperature is 25,200 K**. **Because there is no internal heat source**, Sirius B **will steadily cool** as the remaining heat is radiated into space over more than two billion years.

A white dwarf forms only after the star has evolved from the main sequence and then passed through a red-giant stage. This occurred when Sirius B was less than half its current age, around 120 million years ago. **The original star had an estimated 5 $M_{\odot}$ and was a B-type star** (roughly B4–5) when it was still on the main sequence. While it passed through the red giant stage, Sirius B may have enriched the metallicity of its companion.

Procyon B

With a surface temperature of 7,740 K, it is also much cooler than Sirius B; this is a testament to its lesser mass and greater age. The mass of the progenitor star for Procyon B was about 2.59+0.22−0.18 $M_{\odot}$ **and it came to the end of its life** some 1.19±0.11 Gyr ago, after a main-sequence lifetime of 680±170 Myr.

Van Maanen 2

Like other white dwarfs, it is a very dense star: its mass has **been estimated to** be about 68% of the Sun's, **yet it has only 1% of the Sun's radius**. The outer atmosphere has a temperature of approximately 6,220 K, which is relatively cool for a white dwarf. As all white dwarfs steadily radiate away their heat over time, this temperature can be used to estimate its age, thought to be around 3 billion years.

The progenitor of this white dwarf had an estimated 2.6 solar masses and remained on the main sequence for about 9×10^{8} years. This gives the star a combined age of about 4.1 billion years. **When this star left the main sequence, it expanded into a red giant** that reached a maximum radius of 650 times the current radius of the Sun, or about 3 astronomical units

L 97-12

The mass of L 97-12 is 0.59 ± 0.01 Solar masses, and its surface gravity is $10^{8.00 \pm 0.02}$cm·s^{-2}, or approximately 102,000 of Earth's, corresponding to a radius of 8,887 kilometres (5,522 miles), or 139% of Earth's.

L 97-12 has temperature 5,700 ± 90 K, almost like the Sun, and cooling age, i.e. age **as degenerate star** (not including lifetime as main-sequence star and as giant star) 2.65 ± 0.10 Gyr. Despite it is classified as "white dwarf", it should appear yellow, not white, nearly the same color as the Sun.

ISSN 2229-5518

LP 145-141

LP 145-141 has only 75% of the Sun's mass, but it is the remnant of a massive main-sequence star **that had an estimated 4.4 solar masses**. While it was on the main sequence, **it probably was a spectral class B star** (in the range B4-B9). Most of the star's original mass was shed **after it passed into the asymptotic giant branch stage**, just prior to becoming a white dwarf.

Wolf-Rayet star

The spectra indicate very high surface enhancement of heavy elements, depletion of hydrogen, and strong stellar winds. Their surface temperatures range from 30,000 K to around 200,000 K, hotter than almost all other stars.

WR 2

the exact rotation rate is not known. Estimates range from 500 km/s

WR 46

The effective temperature is over 110,000K, the luminosity greater than 600,000 times the solar luminosity ($L_\odot$), the mass around 25 times that of the Sun ($M_\odot$) and a radius of 2.9 times the solar radius ($R_\odot$). The terminal velocity **of the stellar wind reaches 2450 km/s**

WR 142

Mass **20** M☉
Radius **0.40** R☉
Luminosity (bolometric) 245,000 L☉
Luminosity (visual, LV) 847 L☉
Temperature **200,000** K
Metallicity [Fe/H] 0.0 dex
Rotational velocity (v sin i) 1,000 km/s

WR
Mass **9.0 ± 0.6** M☉
Radius **6 ± 3** R☉
Luminosity (bolometric) 170,000 L☉
Temperature **57,000** K
Age 3.5-5.5 Myr

O

Mass **28.5 ±1.1** M☉
Radius **17 ± 2** R☉

Luminosity (bolometric) 280,000 L☉
Temperature **35,000** K
Age 3.5 -5.5 Myr

The brightest member, **γ² Velorum or γ Velorum A**, is a spectroscopic binary composed of a blue supergiant of spectral class O7.5 (~30 $M_{\odot}$), and a massive Wolf-Rayet star (~9 $M_{\odot}$, originally ~35 $M_{\odot}$). The binary has an orbital period of 78.5 days and separation varying from 0.8 to 1.6 astronomical units.

WR stars

Mass loss is influenced by a star's rotation rate, especially strongly at low metallicity**. Fast rotation** contributes to mixing of core fusion products through the rest of the star, enhancing surface abundances of heavy elements, and driving mass loss

neutron star

As the star's core collapses, its rotation rate increases as a result of conservation of angular momentum, hence newly formed neutron stars **rotate at up to several hundred times per second**. Some neutron stars emit beams of electromagnetic radiation that make them **detectable as pulsars**.

WOH G64

The combination of the star's temperature and luminosity places it toward the upper right corner of the Hertzsprung–Russell diagram**. The star's evolved state means that it can no longer hold on to its atmosphere due to low density, high radiation pressure**

contrary to

Gravitational collapse is the contraction of an **astronomical object due to the influence of its own gravity**, which tends to draw matter inward toward the center of mass. Gravitational collapse is a fundamental mechanism for structure formation in the universe. Over time an initial, relatively smooth distribution of matter will collapse to form pockets of higher density, typically creating a hierarchy of condensed structures such as clusters of galaxies, stellar groups, stars and planets.

Etc.