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Dark Matter? (Rev. 1.2)

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0. Introduction

The purpose of this paper is to determine an accurate description of the behaviour of the sun in the Milky Way by applying Isaac Newton's laws and theories, and thereby discount the need for universal dark matter.

*(Refer to **Appendix 1** for an explanation of the papers, mathematical formulas, constants, symbols and units used in this document)*

1. Conclusions

A combination of Newton's laws and theories and planetary spin theory provides an accurate prediction of the Sun's movement within the Milky Way.

The author thereby considers the need for dark matter unnecessary and therefore does not exist.

The author also discovered that the Milky Way's force-centre is not a neutron star spinning at light-speed, but comprises 1.76572E+41kg of iron, 3.4993E+12m diameter and rotating at 3.6465E-07^c/s; based upon 100 billion equivalent suns in the Milky Way.

1.1 Further Work

Determine accurate values for the radial distance from the force centre to the Sun at its apogee and the eccentricity of the galaxy.

2. The Milky Way System

The only part of the Milky Way required to establish the behaviour of the sun within it; is the sun itself along with its own orbiting bodies and its force-centre. This has been demonstrated by Isaac Newton (along with a small formulaic correction by the author) and the author's own planetary spin theory.

3. Methodology

1) Use Newton's theories to replicate the Sun's orbit in the Milky Way:
    a) Alter the angular velocity of the force-centre until both independently calculated values for Ř are identical (**Table 1**)
    b) Alter the mass of the force centre until the eccentricity of the sun's orbit is correct

2) Use Planetary Spin Theory to:
    a) Alter the density of the force-centre until the Sun's angular velocity is correct
    b) Calculate the number of equivalent Sun's in the Milky Way

4. Calculation Results

The following Table provides the sun's orbital parameters according to Newton:

Symbol &	Formula	Result	Description
Force-Centre:			
G ($m^3/kg/s^2$)	***Constant***	***6.67359232E-11***	gravitational constant
m_1 (kg)	***Input***	***1.1228E+43***[1]	mass
Orbiting Body:			
m_2 (kg)	***Input***	***1.9885E+30***	mass
R_2 (m)	***Input***	***695710000***	radius (of body)
J ($kg.m^2$)	$\frac{2}{5}.m_2.R_2^2$	3.90008115349E+46	polar moment of inertia
Orbit Shape:			
T (s)	***Input***	***7.258248E+15***[2]	orbit period
a (m)	$^3\sqrt{[G.m_1 / (2.\pi/T)^2]}$	2.505311941E+20	major semi-axis
b (m)	$\sqrt{[a^2.(1-e^2)]}$	2.504993572E+20	minor semi-axis
e	$[-\hat{R} + \sqrt{(\hat{R}^2 - 4.a.\{\hat{R}-a\})}]$	0.015941744	eccentricity
p (m)	$a.(1-e^2)$	2.504675243E+20	half-parameter
f (m)	$a.(1-e)$	2.465372900E+20	focus distance from Perigee
x' (m)	$a-f$	3.993904106E+18	focus distance from ellipse centre
L (m)	$\pi . \sqrt{[2.(a^2+b^2) - (a-b)^2 / 2.2]}$	1.574033901E+21	ellipse circumference
K (s^2/m^3)	$(2.\pi)^2 / G.m_1$	3.350257446E-30	factor
A (m^2)	$\pi.a.b$	1.971597673E+41	orbit total area
Body Properties at Perihelion or Perigee:			
$\hat{R}$ (m)	***Input***	***2.465372900E+20***[3]	distance from force centre to body
$\check{F}$ (N)	$G.m_1.m_2 / \hat{R}^2$	3.8551556343E+20[4]	centripetal force on orbiting body
$\check{F}_c$ (N)	$m_2.\check{v}/ \hat{R} . f/p$	3.9166135377E+20[4]	centripetal force on orbiting body
g (m/s^2)	$-G.m_1 / \hat{R}^2$	-1.9387254887E-10	gravitational acceleration on body
$\check{v}$ (m/s)	$h / \hat{R}$	220360.56214	body velocity
$\underline{\boldsymbol{h}}$ (m^2/s)	$\sqrt{[F.p.\hat{R}^2 / m_2]}$	5.4327095813E+25	Newton's motion constant
PE (J)	$m_2.g.\hat{R}$	-9.5043962261E+40	potential energy
KE (J)	$\frac{1}{2}.m_2.\check{v}^2 + \frac{1}{2}.J.(2\pi/t)^2.\omega_1$	4.8279564378E+40	kinetic energy
$\underline{\boldsymbol{E}}$ (J)	PE+KE	-4.6764397883E+40	total energy
Body Properties at Aphelion or Apogee:			
$\check{R}$ (m)	x' + a	**2.54525E+20**[5]	distance from force centre to body
$\check{R}$ (m)	$(-\underline{b}-(\underline{b}\hat{}2-4.\underline{a}.\underline{c})^{0.5}) / 2.\underline{a}$	**2.54525E+20**[5]	distance from force centre to body
$\hat{F}$ (N)	$G.m_1.m_2 / \check{R}^2$	3.616978470E+20 [6]	centripetal force on orbiting body
$\hat{F}_c$ (N)	$m_2.\hat{v}/\check{R} . p/f$	3.616059254E+20 [6]	centripetal force on orbiting body
g (m/s^2)	$-G.m_1 / \check{R}^2$	-1.81895E-10	gravitational acceleration on body
$\hat{v}$ (m/s)	$h / \check{R}$	213444.9459	body velocity
h (m^2/s)	$\underline{\boldsymbol{h}}$	5.4327095813E+25	Newton's motion constant
PE (J)	$m_2.g.\check{R}$	-9.2061180022E+40	potential energy
KE (J)	E-PE	4.5296782139E+40	kinetic energy
E (J)	$\underline{\boldsymbol{E}}$	-4.6764397883E+40	total energy
Table 1: Calculations for the Sun's orbit			

Notes for the Table above:

1) The mass necessary for the orbital period of the sun and its distance from its force-centre at its perigee
2) https://starchild.gsfc.nasa.gov/docs/StarChild/questions/question18.html
3) This value gives zero error, NASA specifies 1.0E+21
4) must be equal to each other for calculations to be correct
5) must be equal to each other for calculations to be correct
6) must be equal to each other for calculations to be correct

The following Table provides the sun's angular velocity according to the author's planetary spin theory {FC stands for the force-centre of the Milky Way}:

ρ_1 (kg/m³)	***Input***	7870	FC density
J_{FC} (kg.m²)	$\frac{2}{5}.m_1.(3.m_1 / 4.\pi.\rho_1)^{2/3}$	2.1903916245E+68	Polar moment of inertia of the FC
KE (J)	$\frac{1}{2}.(KE_{Ta} + KE_{Tp})$	1.9896512359E+35	Kinetic energy of the sun's orbitals
$\omega_i^{(5)}$ (c/s)	$(2.KE / J)^{0.5}$	2.8653290846E-06	Angular velocity of the Sun due to
J (kg.m²)	$\frac{2}{5}.m_2.(\Delta.R)^2$	3.9000811535E+46	Polar moment of inertia of the Sun
E_S (J)	$\frac{1}{2}.J.\omega_o^2$	1.4613013275E+16	Spin energy generated by orbiting Sun
ω_o (c/s)	$2.\pi / T$	8.6566142507E-16	Angular velocity of orbiting Sun
E_{FC} (J)	$\frac{1}{2}.(PE_{Ta} + PE_{Tp})$	-1.4900437688E+42	FC energy that induces spin in the Sun
ω_r (c/s)	$(2.E_{FC} / J_{FC})^{0.5}$	1.1664164223E-13	FC induced angular velocity
ω (c/s)	**$\omega_i + \omega_o + \omega_r$**	**2.8653290846E-06**	**Calculated angular velocity of the Sun**
ω_a (c/s)		**2.8653290846E-06**	**Actual angular velocity of the Sun**
error	**$1 - \omega/\omega_a$**	**0.000000000**	

Table 2: Calculations for the Sun's angular velocity

The number of Stars in the Milky Way (Planetary Spin Theory):
m = 1.7657E+41 kg (the mass of Milky Way's force-centre {**Table 1**})
ρ = 7870 kg/m³ (density of Milky Way's force-centre {**Table 1**})
$R = (3.m / 4.\pi.\rho)^{1/3}$ = 1.7496567118E+12 m (radius of Milky Way's force-centre)
$J = \frac{2}{5}.m.R^2$ = 2.1621587048E+65 kg.m² (moment of angular inertia of Milky Way's force-centre)
KE_p = 4.8279564378E+40 J (kinetic energy of the sun at its perigee {**Table 1**})
PE_a = -9.2061180022E+40 J (kinetic energy of the sun at its apogee {**Table 1**})
$KE_{sun} = KE_a - KE_p$ = 1.4034074440E+41 J (kinetic energy of the sun used to rotate Milky Way's force-centre)
$KE_{FC} = \frac{1}{2}J.\omega_1^2$ = 1.4375071338E+52 J (rotational kinetic energy in Milky Way's force-centre)
$N = KE_{FC} / KE_{sun}$ = 1.02429E+11 (the number of Suns required to rotate Milky Way's force-centre)
$\omega_{FC} = \sqrt{[2.KE_{FC} / J]}$ = 3.6465E-07 c/s (actual angular velocity of the Milky Way's force-centre)

5.1 Claims

Claim 1: Newton's theories work for the Milky Way without the need for Dark Matter

Claim 2: The density of the Milky Way's force-centre is that of iron

Claim 3: The mass of the Milky Way's force-centre is ≈ 1.7657E+41 kg

Claim 4: The angular velocity of the Milky Way's force-centre is ≤ 3.6465E-07 c/s

Claim 5: The number of stars in Milky Way is equivalent to 1E+11 solar systems

These claims are dependent upon the accuracy of the orbital inputs used in **Table 1** from NASA

Appendices

Appendix 1: Papers, Mathematical Constants, Formulas, Symbols & Units

Appendix 1: Papers, Mathematical Symbols & Units

This paper should be read in conjunction with the following:

http://calqlata.com/Maths/Formulas_Laws_of_Motion.html

http://calqlata.com/Maths/Formulas_Orbits.html

http://calqlata.com/Maths/Formulas_Planetary_Spin.html

Refer to CalQlata's **Definitions** (http://calqlata.com/help_definitions.htm) for an explanation of the terms used in this paper