Mathematics of Dynamic Universe Model explain Pioneer Anomaly

SNP. Gupta[1,*], *JVS. Murty*[2], *SSV.Krishna*[3]

[1]*AGM (C&IT), Bhilai Steel plant; India,*

[2]*Associate Professor, G.V.P. College of Engineering , Visakhapatnm , AP India,*

[3]*Senior HANA technical Engineer, SAPLabs, Palo Alto, CA, USA*

- Corresponding Author

e-mail: [1]*snp.gupta@gmail.com* [2]*jvsmurty@yahoo.com*,

[3]*ss.vamsikrishna@gmail.com*

September 16, 2013, Bhilai

AMS Subject Classifications: 70F10 (n- Body problems) , 70F15 (Celestial Mechanics), 70E55 (Dynamics of Multibody systems) 70-05 (Experimental work) 70-08 (Computational methods)

Key Words: Solar system, stars: rotation curves, Missing mass in Galaxies, Galaxy: structure , Galaxy: kinematics and dynamics, cosmology: observations, cosmology: theory, (cosmology:) dark matter, Dynamic universe model, models of cosmology, singularity-free cosmology, SITA simulations, Pioneer Anomaly.

Abstract: A new type of tensor mathematics used in Dynamic universe model can be used to solve the Pioneer Anomaly. “The Pioneer anomaly or Pioneer effect is the observed deviation from expectations of the trajectories of various unmanned spacecraft visiting the outer solar system, notably Pioneer 10 and Pioneer 11. Both spacecraft are escaping from the solar system, and are slowing down under the influence of the Sun's gravity.” as described by Wikipedia. Dynamic universe model of cosmology explains Pioneer anomaly. It shows effectively the acceleration due to gravity of SUN increases towards SUN, approximately beyond Mercury -4.44202E-07 m /sec^2 ; beyond MOON -2.11409E-08 m /sec^2 ; beyond Mars -2.11E-08 m /sec^2 ; beyond Jupiter -2.30844E-05 m /sec^2 ; beyond Saturn -2.44565E-06 m /sec^2 ; beyond Uranus -8.91522E-08 m /sec^2 and beyond Neptune -4.3E-09 m /sec^2. The negative sign indicates that the force is acting towards SUN in the same direction as SUN’s acceleration due to gravity. These values are approximate and depend not only on distance from SUN to the test particle, but also overall effect of gravitation of near by stars, Milkyway and its center, globular clusters and Local system.

1 Introduction: The Problem.

Calculations of the radio Doppler and ranging data, which gives information on the velocity and distance of both the Pioneer spacecraft; shows an acceleration of (8.74 ± 1.33) × 10−10 m/s2 for both spacecraft towards Sun,

compared to the predicted position data. Even after their relative proximity to the Sun, Galileo and Ulysses spacecraft also shows a similar effect, and they are spin-stabilized, no thrusters. The measured value of acceleration difference for Cassini satellite is (26.7 ± 1.1) × 10−10 m/s2, but that includes some thermal effects. What is the result of these thermal effects is not known. At present there is no universally accepted explanation for this problem. Please see Wikipedia [1] for a compilation of results of a lengthy survey.

Anderson JD, Published many papers individually and along with others for understanding of the Pioneer Anomaly. 'Study of the anomalous acceleration of Pioneer 10 and 11' is one of his well-known papers. He did not make any conclusions for the reasons of this Pioneer anomaly. See references [4, 5, 6, 44, 62, and 79] for further details. Antonio F. Ranada (2005) thought it is an example for the acceleration of clocks [7]. Scheffe [74] said Pioneer Anomaly is due to either gas leaks or thermal radiation, or a combination of the two, could explain both the linear and angular accelerations that are measured. But was later confirmed that there are not many Gas leaks and thermal radiations cannot create acceleration that increases effect of Sun's acceleration. Scientific American [75,76] gave two good reports, without any definite conclusions. One of the very good reports (Director's report) is by Slava, [6, 70, 78], expressed the same conclusion of unknown possibility. See Pioneer Explorer collaboration for some more details [71]. There are many authors like Dittus [26], Adi Nusser [2], Bahcall N. et al [9], Benson A.J. et al [11], Bowen[14], Broadhurst [15] will make

good further reading. In many places of BAUT forums [10] one can find interesting discussions. Brownstein [16] and Lorenzo Iorio [53] correctly thought this is a Gravitational problem but they could not take into account of gravitation of other planets and celestial bodies. Many computer sleuths also tried to solve this Pioneer problem [22]. David Harris [23] felt this Pioneer spacecraft's unknown accelerations becoming unexplainable and boring. Erhard Scholz is another author who found no solution [31]. McCulloch [54 .57] tried explaining Pioneer and flyby anomalies using a modification of inertia. But why we require to change the inertia? M.Milgrom [55] tried modifying Dynamics. Masreliez [56] gave a cosmological explanation, Michael Martin Nieto [6, 58, 79] added the New Horizons satellite also to this problem. Nieto [61,62] also tried to solve this anomaly.

Here the Dynamic Universe Model offers a solution why there will be more attraction force towards SUN. Here we have done some approximations due to two reasons. Total data was not available. Even if the data available, there is no computer which can handle all that data of 10^13 stars individually.

1.1 Dynamic Universe Model Introduction:

Dynamic universe model is different from Newtonian static model, Einstein's [28,29,30,52] Special & General theories of Relativity, Hoyle's Steady state theory [37], Bekenstein 's MOND [39], M-theory & String theories or any of the Unified field theories. It is basically computationally intensive real

observational data based theoretical system. It is based on non uniform densities of matter distribution in space. There is no space time continuum. It uses the fact that mass of moon is different to that of a Galaxy. No negative time. No singularity of any kind. No divide by zero error in any computation/ calculation till today. No black holes, No Bigbang or no many minute Bigbangs. All real numbers are used with no imaginary number. Geometry is in Euclidian space. Some of its earlier results are non collapsing non symmetric mass distributions. It proves that there is no missing mass in Galaxy due to circular velocity curves. Today it tries to solve the Pioneer anomaly. It is single closed Universe Model.

Hymn of Creation in Rugveda slokas [38] can be the starting point of Dynamic universe model. This Hymn says nobody knows how the universe started including Gods, which can safely be concluded as there was no start to the Universe at all. We can clearly see that our universe is not a Newtonian type static universe. There is no Big bang singularity, so "What happened before Big bang?" question does not arise. Ours is neither an expanding nor contracting universe. It is not infinite but it is a closed finite universe. Our universe is neither isotropic nor homogeneous. It is LUMPY. But it is not empty. It may not hold an infinite sink at the infinity to hold all the energy that is escaped. This is closed universe and no energy will go out of it. Ours is not a steady state universe in the sense, it does not require matter generation through empty spaces. No starting point of time is required. Time and spatial coordinates can be chosen as required. No imaginary

time, perpendicular to normal time axis, is required. No baby universes, black holes or warm holes were built in.

This universe exists now in the present state, it existed earlier, and it will continue to exist in future also in a similar way. All physical laws will work at any time and at any place. Evidences for the three dimensional rotations or the dynamism of the universe can be seen in the streaming motions of local group and local cluster. Here in this dynamic universe, both the red shifted and blue shifted Galaxies co-exist simultaneously. The first author also showed 'Absolute Rest frame of reference is not necessary' (1994) [79], 'Multiple bending of light ray can create many images for one Galaxy: in our dynamic universe'[80, 93], About "SITA" simulations [90, 91, 92], 'Missing mass in Galaxy is NOT required' [87, 88, 89], "New mathematics tensors without Differential and Integral equations" [94, 81, 95], "Information, Reality and Relics of Cosmic Microwave Background" [86], "Dynamic Universe Model explains the Discrepancies of Very-Long-Baseline Interferometry Observations." [84, 85], "Dynamic Universe Model Predicts The Trajectory Of New Horizons Satellite Going To Pluto" [84], "Singularity Free N-Body Simulations Called `Dynamic Universe Model' Don't Require Dark Matter" [84] and Chaired a 6 hour session on mathematics in a Seminar [83].

In this work we use the real data of the Planets in Solar system, moon, SUN, near star data starting from Proxima Centauri, Milky way parts and its

center, Globular clusters, Andromeda Galaxy and Triangulum Galaxy as on start of year 2000, at 0,0 hours only.

The Oort cloud and Kuiper belt are nearly a light-year distance, from the Sun, They are after Neptune and Pluto. We did not consider any mass between Pluto and the near star Proxima centaury. Asteroids also we did not consider.

F.J. Oliveira (2007) took another step and tried to link it with dark matter [32]. Dynamic Universe model explains this Pioneer anomaly without considering any dark matter, but gets the solution by considering only the gravitations of all the other astronomical bodies surrounding us. No invisible dark matter is assumed to create additional gravitational force towards SUN. It is not necessary. And I dare say our SINGLE Universe also don't use any dark matter to attract back the Pioneer satellite towards SUN. It is the Gravitation effect of the Universe on any single body (mass), which varies from place to place and time to time. Dark matter is a calculation error, you saw in the paper Densemass Equations. The same equations set give these missing mass results also. This missing mass in Galaxies is the BASIS for the dark matter. Hence 'Dark matter' is a calculation error when you are not considering the gravitation effect of a Huge central mass at the centre of Galaxy and External Galaxies together on the circular velocities of stars in the arms of Galaxy.

This is a normal physical mathematical model. Real calculations are done on computer, No imaginary numbers were used. Nothing abnormal assumed any where. It is basically computationally intensive real observational data based theoretical system. It is based on non uniform densities of matter distribution in space. It uses the fact that mass of moon is different to that of a Galaxy. No negative time. No singularity of any kind. No divide by zero error in any computation/ calculation till today. Geometry is in Euclidian space. All real numbers are used with no imaginary number. Here in Dynamic universe model of Cosmology, all bodies move and keep them selves in dynamic equilibrium with all other bodies depending on their present positions, velocities and masses. Some of its earlier results are non collapsing non symmetric mass distributions. It proves that there is no missing mass in Galaxy due to circular velocity curves. Today it tries to solve the Pioneer anomaly. And just normal physical equations are sufficient for all these results….

One of the basic principles of Dynamic universe model of Cosmology, all bodies move and keep them selves in Dynamic equilibrium with all other bodies depending on their present positions, velocities and masses.

Only differences are Initial values & time step. The structure of masses is same. In first three I used approximate values of masses and distances. In the forth

‘Pioneer anomaly’-the present one, real values of masses and distances were used for a close approximation.

Dark matter is a calculation error, as in the paper Densemass Equations. The same equations set give these missing mass results also. This missing mass in Galaxies is the BASIS for the dark matter. Hence ‘Dark matter’ is a calculation error when you are not considering the gravitation effect of a Huge central mass at the centre of Galaxy and External Galaxies together on the circular velocities of stars in the arms of Galaxy. See Robert Temple (2003) [72], for the rotation curves of Galaxies.

A point to be noted here is that the Dynamic Universe Model never reduces to General relativity on any condition. It uses a different type of mathematics based on Newtonian physics. This mathematics used here is simple and straightforward. As there are no differential equations present in Dynamic Universe Model, the set of equations give single solution in x y z Cartesian coordinates for every point mass for every time step. All the mathematics and the Excel based software details are explained in the three books published by the author [82, 96, 97]. The fourth book in the series on Dynamic Universe Model: SITA, gave simulations that predicted the existence of the large number of Blueshifted Galaxies in 2004, ie., more than about 35 ~ 40 Blueshifted Galaxies known at the time of Astronomer Edwin Hubble in 1930s. The far greater numbers of Blueshifted galaxies was confirmed by the Hubble Space Telescope (HST)

observations in the year 2009. Today the known number of Blue shifted Galaxies is more than 7000 scattered all over the sky and the number is increasing day by day.In addition Quasars, UV Galaxies, X-ray, γ- Ray sources and other Blue Galaxies etc., are also Blue shifted Galaxies. Out of a 930,000 Galaxy spectra in the SDSS database, 40% are images for Galaxies; that gives to 558,000 Galaxies. There are 120,000 Quasars, 50,000 brotherhood(X-ray, γ-ray, Blue Galaxies etc.,) of quasars, 7000 blue shifted galaxies. That is more than 31.7% of available Galaxy count are Blue shifted. Just to support Bigbang theory, we are neglecting such a huge amount Blue shifted Galaxies. It appears to be a Godly Devotion to Bigbang cosmologies!

2. Mathematical Background:

Let us assume an inhomogeneous and anisotropic set of N point masses moving under mutual gravitation as a system and these point masses are also under the gravitational influence of other additional systems with a different number of point masses in these different additional systems. For a broader perspective see the author's work, let us call this set of all the systems of point masses as an Ensemble. Let us further assume that there are many Ensembles each consisting of a different number of systems with different number of point masses. Similarly, let us further call a group of Ensembles as Aggregate. Let us further define a Conglomeration as a set of Aggregates and let a further higher system have a number of conglomerations and so on and so forth.

Initially, let us assume a set of N mutually gravitating point masses in a system under Newtonian Gravitation. Let the α^{th}point mass has mass m_α, and is in position x_α. In addition to the mutual gravitational force, there exists an external ϕ_{ext}, due to other systems, ensembles, aggregates, and conglomerations etc., which also influence the total force F_α acting on the point mass α. In this case, the ϕ_{ext} is not a constant universal Gravitational field but it is the total vectorial sum of fields at $x_\alpha$due to all the external to its system bodies and with that configuration at that moment of time, external to its system of N point masses.

Total Mass of system = $$M = \sum_{\alpha=1}^{N} m_\alpha \qquad (1)$$

Total force on the point massα is Fα , Let $F_{\alpha\beta}$ is the gravitational force on the α^{th}point mass due to β^{th}point mass.

$$F_\alpha = \sum_{\substack{\alpha=1 \\ \alpha\neq\beta}}^{N} F_{\alpha\beta} - m_\alpha \nabla_\alpha \Phi_{ext}(\alpha) \qquad (2)$$

Moment of inertia tensor

Consider a system of N point masses with mass m_α, at positions X_α, α=1, 2,…N;

The moment of inertia tensor is in external back ground field ϕ_{ext}.

$$I_{jk} = \sum_{\alpha=1}^{N} m_\alpha x_j^\alpha x_k^\alpha \tag{3}$$

Its second derivative is

$$\frac{d^2 I_{jk}}{dt^2} = \sum_{\alpha=1}^{N} m_\alpha \left(\overset{\circ\circ}{x}_j^\alpha \, x_k^\alpha + \overset{\circ}{x}_j^\alpha \, \overset{\circ}{x}_k^\alpha + x_j^\alpha \, \overset{\circ\circ}{x}_k^\alpha \right) \tag{4}$$

The total force acting on the point massα is and $\hat{F}$ is the unit vector of force at that place of that component.

$$F_j^\alpha = m_\alpha \, \overset{\circ\circ}{x}_j^\alpha = \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{G m_\alpha m_\beta \left(x_j^\beta - x_j^\alpha \right) \hat{F}}{\left| x^\beta - x^\alpha \right|^3} - \nabla \Phi_{ext,j} m_\alpha \tag{5}$$

Writing a similar formula for F^α_k

$$F_k^\alpha = m_\alpha \, \overset{\circ\circ}{x}_k^\alpha = \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{G m_\alpha m_\beta \left(x_k^\beta - x_k^\alpha \right) \hat{F}}{\left| x^\beta - x^\alpha \right|^3} - \nabla \Phi_{ext,k} m_\alpha \tag{6}$$

$$\ddot{x}_j^{\alpha} = \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{Gm_{\beta}\left(x_j^{\beta} - x_j^{\alpha}\right)\hat{F}}{\left|x^{\beta} - x^{\alpha}\right|^3} - \nabla\Phi_{ext}$$

OR => (7)

$$\ddot{x}_k^{\alpha} = \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{Gm_{\beta}\left(x_k^{\beta} - x_k^{\alpha}\right)}{\left|x^{\beta} - x^{\alpha}\right|^3} - \nabla\Phi_{ext}$$

And => (8)

Lets define Energy tensor (in the external field ϕ_{ext})

$$\frac{d^2 I_{jk}}{dt^2} = 2\sum_{\alpha=1}^{N} m_{\alpha}\left(\dot{x}_j^{\alpha}\dot{x}_k^{\alpha} \right) + \sum_{\substack{\alpha=1 \\ \alpha\neq\beta}}^{N}\sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{Gm_{\alpha}m_{\beta}\left\{ \left(x_k^{\beta} - x_k^{\alpha}\right)x_j^{\alpha} + \left(x_j^{\beta} - x_j^{\alpha}\right)x_k^{\alpha} \right\}}{\left|x^{\beta} - x^{\alpha}\right|^3}$$

$$- \sum_{\alpha=1}^{N} \nabla\Phi_{ext} m_{\alpha} x_j^{\alpha} - \sum_{\alpha=1}^{N} \nabla\Phi_{ext} m_{\alpha} x_k^{\alpha}$$

(9)

Lets denote Potential energy tensor = Wjk =

$$\sum_{\substack{\alpha=1 \\ \alpha\neq\beta}}^{N}\sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{Gm_{\alpha}m_{\beta}\left\{ \left(x_k^{\beta} - x_k^{\alpha}\right)x_j^{\alpha} + \left(x_j^{\beta} - x_j^{\alpha}\right)x_k^{\alpha} \right\}}{\left|x^{\beta} - x^{\alpha}\right|^3}$$

(10)

Lets denote Kinetic energy tensor =

$$2\,K_{jk} = 2\sum_{\alpha=1}^{N} m_\alpha \left(\overset{\circ}{x}_j^\alpha \overset{\circ}{x}_k^\alpha \right) \tag{11}$$

Lets denote External potential energy tensor = $2\,\Phi_{jk}$

$$= \sum_{\alpha=1}^{N} \nabla\Phi_{ext} m_\alpha x_j^\alpha + \sum_{\alpha=1}^{N} \nabla\Phi_{ext} m_\alpha x_k^\alpha \tag{12}$$

$$\text{Hence} \quad \frac{d^2 I_{jk}}{dt^2} = W_{jk} + 2K_{jk} - 2\Phi_{jk} \tag{13}$$

Here in this case

$$F(\alpha) = \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} F_{\alpha\beta} - \nabla_\alpha \Phi_{ext}(\alpha) m_\alpha$$

$$= \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{G m_\alpha m_\beta \left(x^\beta - x^\alpha\right)}{\left|x^\beta - x^\alpha\right|^3} - \nabla\Phi_{ext} m_\alpha \tag{14}$$

$$= \left\{ \overset{\circ\circ}{x}{}^\alpha (\text{int}) - \nabla_\alpha \Phi_{ext}(\alpha) \right\} m_\alpha \tag{15}$$

$$\overset{\circ\circ}{x}(\alpha) = \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N} \frac{G m_\beta \left(x^\beta - x^\alpha\right)}{\left|x^\beta - x^\alpha\right|^3} - \nabla\Phi_{ext} \tag{16}$$

We know that the total force at $x(\alpha) = F_{tot}(\alpha) = -\nabla_\alpha \Phi_{tot}(\alpha) m_\alpha$

Total PE at $\alpha = m_\alpha \Phi_{tot}(\alpha) = -\int F_{tot}(\alpha) dx$

$$= -\int \left\{ \sum_{\substack{\beta=1 \\ \alpha \neq \beta}}^{N} \overset{\circ\circ\ \alpha}{x}_{\text{int}} m_\alpha - \nabla_\alpha \Phi_{ext}(\alpha) m_\alpha - \right\} dx$$

$$= \int \sum_{\substack{\beta=1 \\ \alpha \neq \beta}}^{N} \frac{G m_\beta m_\alpha \left(x^\beta - x^\alpha \right)}{\left| x^\beta - x^\alpha \right|^3} dx - \int \nabla \Phi_{ext} m_\alpha dx \qquad (17)$$

Therefore total Gravitational potential $\phi_{tot}(\alpha)$ at x (α) per unit mass

$$\Phi_{tot}(\alpha) = \Phi_{ext} - \sum_{\substack{\beta=1 \\ \alpha \neq \beta}}^{N} \frac{G m_\beta}{\left| x^\beta - x^\alpha \right|} \qquad (18\text{-s})$$

Lets discuss the properties of ϕ_{ext} :-

ϕ_{ext} can be subdivided into 3 parts mainly

ϕ_{ext} due to higher level system, ϕ_{ext} -due to lower level system, ϕ_{ext} due to present level. [Level : when we are considering point mass in the same system (Galaxy) it is same level, higher level is cluster of galaxies, and lower level is planets & asteroids].

ϕ_{ext} due to lower levels : If the lower level is existing, at the lower level of the system under consideration, then its own level was considered by system equations. If this lower level exists anywhere outside of the system, center of (mass) gravity outside systems (Galaxies) will act as unit its own internal lower level practically will be considered into calculations. Hence consideration of any lower level is not necessary.

2.1 SYSTEM – ENSEMBLE:

Until now we have considered the system level equations and the meaning of $\phi_{ext.}$ Now let's consider an ENSEMBLE of system consisting of N_1, N_2 … Nj point masses in each. These systems are moving in the ensemble due to mutual gravitation between them. For example, each system is a Galaxy, and then ensemble represents a local group. Suppose number of Galaxies is j, Galaxies are systems with point masss N1, N2 ….NJ, we will consider ϕ_{ext} as discussed above. That is we will consider the effect of only higher level system like external Galaxies as a whole, or external local groups as a whole.

Ensemble Equations (Ensemble consists of many systems)

$$\frac{d^2 I^{\gamma}{}_{jk}}{dt^2} = W^{\gamma}_{jk} + 2K^{\gamma}_{jk} - 2\Phi^{\gamma}_{jk} \qquad (18\text{-E})$$

Here $^{\gamma}$ denotes Ensemble.

This Φ^{γ}jk is the external field produced at system level. And for system

$$\frac{d^2 I_{jk}}{dt^2} = W_{jk} + 2K_{jk} - 2\Phi_{jk} \qquad (13)$$

Assume ensemble in a isolated place. Gravitational potential $\phi_{ext}(\alpha)$produced at system level is produced by Ensemble and $\phi^{\gamma}{}_{ext}(\alpha) = 0$ as ensemble is in a isolated place.

$$\Phi^{\gamma}_{tot}(\alpha) = \Phi^{\gamma}_{ext} - \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\gamma}} \frac{Gm^{\gamma}_{\beta}}{\left| x^{\gamma\beta} - x^{\gamma\alpha} \right|} \qquad (19)$$

There fore

$$\Phi^{\gamma}_{tot} = \Phi_{ext}(\alpha) = -\sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\gamma}} \frac{Gm^{\gamma}_{\beta}}{\left| x^{\gamma\beta} - x^{\gamma\alpha} \right|} \qquad (20)$$

And $2\Phi_{jk} = -\frac{d^2 I_{jk}}{dt^2} + W_{jk} + 2K_{jk}$ (13)

$$= \sum_{\alpha=1}^{N} \nabla\Phi_{ext} m_\alpha x_j^\alpha + \sum_{\alpha=1}^{N} \nabla\Phi_{ext} m_\alpha x_k^\alpha \qquad (21)$$

AGGREGATE Equations(Aggregate consists of many Ensembles)

$$\frac{d^2 I_{jk}^{\delta\gamma}}{dt^2} = W_{jk}^{\delta\gamma} + 2K_{jk}^{\delta\gamma} - 2\Phi_{jk}^{\delta\gamma} \qquad (18\text{-A})$$

Here $^{\delta}$ denotes Aggregate.

This $\Phi^{\delta\gamma}$jk is the external field produced at Ensemble level. And for Ensemble

$$\frac{d^2 I^{\gamma}{}_{jk}}{dt^2} = W_{jk}^{\gamma} + 2K_{jk}^{\gamma} - 2\Phi_{jk}^{\gamma} \qquad (18\text{-E})$$

Assume Aggregate in an isolated place. Gravitational potential ϕ_{ext} (α) produced at Ensemble level is produced by Aggregate and $\phi^{\delta\gamma}{}_{ext}(\alpha) = 0$ as Aggregate is in a isolated place.

$$\Phi_{tot}^{\delta\gamma}(\alpha) = \Phi_{ext}^{\delta\gamma} - \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\delta\gamma}} \frac{Gm_\beta^{\delta\gamma}}{\left| x^{\delta\gamma\beta} - x^{\delta\gamma\alpha} \right|} \qquad (22)$$

Therefore

$$\Phi_{tot}^{\delta\gamma}(_{Aggregate}) = \Phi_{ext}^{\gamma}(\alpha)(_{Ensemble}) = -\sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\delta\gamma}} \frac{Gm_\beta^{\delta\gamma}}{\left| x^{\delta\gamma\beta} - x^{\delta\gamma\alpha} \right|} \qquad (23)$$

And $$\Phi^{\gamma}_{jk} = \sum_{\alpha=1}^{N^{\gamma}} \nabla\Phi^{\delta}_{ext}\, m_{\alpha} x^{\delta\alpha}_{j} + \sum_{\alpha=1}^{N} \nabla\Phi^{\delta}_{ext}\, m_{\alpha} x^{\delta\alpha}_{k} \quad (24)$$

Total AGGREGATE Equations :(Aggregate consists of many Ensembles and systems) Assuming these forces are conservative, we can find the resultant force by adding separate forces vectorially from equations (20) and (23).

$$\Phi_{ext}(\alpha) = -\sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\gamma}} \frac{Gm^{\gamma}_{\beta}}{\left| x^{\gamma\beta} - x^{\gamma\alpha} \right|} - \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\delta\gamma}} \frac{Gm^{\delta\gamma}_{\beta}}{\left| x^{\delta\gamma\beta} - x^{\delta\gamma\alpha} \right|} \quad (25)$$

This concept can be extended to still higher levels in a similar way.

2.2 Corollary 1:

$$\frac{d^2 I_{jk}}{dt^2} = W_{jk} + 2K_{jk} - 2\Phi_{jk} \quad (13)$$

The above equation becomes scalar Virial theorem in the absence of external field, that is ϕ=0 and in steady state,

i.e. $\frac{d^2 I_{jk}}{dt^2} = 0$ (27)

$2K + W = 0$ (28)

But when the N-bodies are moving under the influence of mutual gravitation without external field then only the above equation (28) is applicable.

2.3 Corollary 2:

Ensemble achieved a steady state,

i.e. $\frac{d^2 I^{\gamma}_{jk}}{dt^2} = 0$ (29)

$$W^{\gamma}_{jk} + 2K^{\gamma}_{jk} = 2\Phi^{\gamma}_{jk} \quad (30)$$

This Φjk external field produced at system level. Ensemble achieved a steady state; means system also reached steady state.

i.e. $\frac{d^2 I_{jk}}{dt^2} = 0$ (27)

$$W_{jk} + 2K_{jk} = 2\Phi^{\gamma}_{jk} \qquad (31)$$

The Equation 25 is the main powerful equation, which gives many results that are not possible otherwise today. This tensor can be subdivided into 21000 small equations without any differential equations or integral equations. Hence, this set up gives a unique solution of Cartesian X, Y, Z components of coordinates, velocities and accelerations of each point mass in the setup for that particular instant of time. A point to be noted here is that the Dynamic Universe Model never reduces to General relativity on any condition. It uses a different type of mathematics based on Newtonian physics. This mathematics used here is simple and straightforward. All the mathematics and the Excel based software details are explained in the first three books published by the author [82,96,97] In the first book [82], the solution to N-body problem-called Dynamic Universe Model (SITA) is presented; which is singularity-free, inter-body collision free and dynamically stable. This is the Basic Theory of Dynamic Universe Model published in 2010[82]. The second book in the series describes the SITA software in EXCEL emphasizing the singularity free portions. It explains more than 21,000 different equations (2011)[96]. The third book describes the SITA software in EXCEL in the accompanying CD / DVD emphasizing mainly HANDS ON usage

of a simplified version in an easy way. The third book contains explanation for 3000 equations instead of earlier 21000 (2011)[97].

3. Other Cosmologies - Comparison

Newton's static universe model requires fine balancing of bodies in all directions, so that all bodies stay in static equilibrium of attraction forces. This was described as such equilibrium as though a set of needles is finely balancing on their noses, any small disturbance will cause all to fall. Here in our Dynamic universe model, gravitational attraction forces are balanced, by centrifugal forces. SITA proves that bodies will not collapse but revolve about each other. Dynamic universe model will not have Big-bang singularity, as we are proposing a anisotropic and heterogeneous universe model without considering the General relativity. This is a Dynamic Universe Model without space-time continuum. Hence singularity theorem is not applicable here. Hawking and Penrose (1969, 1996) [34,36] in their singularity theorem said that 'Isotropic and homogeneous expanding universe, there must be a Big bang singularity some time in the past according to General theory of relativity. PCP was not considered true here as in steady state universe we need not assume any homogeneity and isotropy here at any point of time. Matter need not be created to keep the density constant. The Steady state cosmological model was presented by Hoyle (1948) [37]. The perfect cosmological principle (PCP) stated by Hoyle [37]is that, Isotropy and

homogeneity and other statistical properties of the universe are time independent. Universe has no beginning. No starting point for time scale. Matter is required to be created to keep the density ρ constant in the expanding universe. {In a recent paper Aguirre [3] and Gratton (2002), time like geodesics are not complete in Hoyle's [37] Steady-state model. They proposed a geodesically complete Steady-state model, in which two universes are simultaneously present. In one of them, the universe is expanding and time is moving forwards, and in the other, it is contracting and time is moving backwards.} Friedmann-Robertson-Walker models are popular. These are standard Bigbang models. Naturally all the problems inherent in the Bigbang models are present here also. In the absence of other working cosmological models, many workers choose these next. Missing mass, lesser age of the universe, anisotropy of cosmic microwave background, Bigbang singularity etc., are some of the problems present in these models. Bowen and Ferreira (2002) said, In models by de Sitter or any other matter filled models, there will be mass loss by scalar charges in these types of expanding universe models. That means a point like particle carrying charge q , acts like a source for mass less scalar field ϕ. It looses its mass in time. There is one more popular line of thought, which is being seen now a days. They are CYCLIC UNIVERSE models presented by many workers. We will see some the recent work done by Steinhardt and Turok, [9, 65, 66] in which the universe starts from Bigbang to end up in Big-crunch only to start again in Bigbang to start the cycle. They attempted to say a little about, what happened before Bigbang. Hawking and Penrose (1960,

1996) [37], (for detailed work see Hawking and Ellis (1973)) [34, 35, 36], in their singularity theorem, showed that Big-crunch heads towards a cosmic singularity, where General relativity fails. After big crunch what happens, nobody knows. There is a basic problem in all these models, including String theory and M-theory; the matter density is significantly low, which makes these models impractical. In these models the universe is flat but not closed. So the question comes what happens to all these radiation? Steinhardt and Turok (2002), [9, 65,66] presented another model of CYCLIC universe, to overcome the problem of failure of General relativity after Big-Crunch. They pushed the Big-crunch singularity into 5^{th} dimension, so that other three spatial and one time coordinates will be intact. It may be Steady state model or CYCLIC universe model; one thing is there in common. Both types of models ask for the CREATION of matter from vacuum. Earlier on this point the Bigbang people were criticizing the Steady state people. Now lets see about Rotation models presented various authors from Gödel (1949) to Korotky and Obukhov (1996) [47, 48]. There were many authors. Gödel (1949) [33] metric described the solution of General relativity with homogeneous space-time and with casualty condition violated. All these people gave mainly a line element as a solution to Einstein's [29] General relativity and tested that solution. No body talked about revolution. Mainly they argued about the rotation of universe, saying "when every thing rotating, why not universe also?" But they have not considered the revolution of parts of the universe. Another difficulty faced by Korotky and Obukhov (1996) [47, 48], is that it is impossible to combine

pure rotation with expansion of universe in a solution of General relativity for a pure simple source. There were many authors who faced problems like closed time like curves (CTCs). See Yu. N. Obukhov (1992) [99, 47, 48], and Saulo Carneiro (2000) [73]. The problems like non linearity of coordinate axes and interdependency between coordinate axes is still present inherently in all these models. Authors like Pavelkin [67], Perlmutter [9, 68], Jambrina et al [40], John M.V. et al [45], Kauffmann et al [46], Li-Xin Li [51], etc., will make further study on this subject.

There is a fundamental difference between galaxies / systems of galaxies and systems that normally use statistical mechanics, such as molecules in a box. The molecules repel each other. But in gravitation we have not yet experienced any repulsive forces. (See for ref: Binny and Tremaine 1987 [41]). Only attraction forces were seen. Einstein introduced cosmological constant λ to introduce repulsive forces at large scales like inter galactic distances in his General relativity based cosmological considerations in for expanding universe 1917 [30]. This was not liked by many, and created turbulence in the scientific world. One of the reasons for his cosmological constant λ is that he disliked the picture at infinity given by Newtonian gravitation. Though his ideas about infinity were good, the cosmological constant $\lambda$and repulsive forces created havoc in the scientific community for at least last hundred years! Almost every worker / scientist in this

field faced problems either conceptually or mathematically. Singularities were big hurdles for many of us.

Here Blue and Red shifted galaxies will be present simultaneously. We need not introduce large correction factors to convert Blue shifted galaxies into Red shifted galaxies.

4. SITA (S*imulation* of I*nter-intra-Galaxy* T*autness and* A*ttraction forces*):

SITA is a totally non-general relativistic algorithm. Here in NO way GR effects are taken into consideration. No space-time continuum. No λ factor to introduce repulsion between Galaxies at any distance. In this SITA Simulation Universe is assumed to be dynamically moving & rotating. This is not a static model as assumed by Newton. Additionally on SITA, an inhomogeneous and anisotropic lumpy universe was assumed. Details of the structure formations are given below. Using the equations developed in the mathematic formulation section, calculations are done to find vectorial resultant forces on each particle for above configuration. Starting with one- micro second time step. Later the time step was changed to, one second , one minute, one hour, one day, one week, one month , and one year. These steps were given to give a better resolution of initial stages of formations from the starting of simulation. [SNP. Gupta,2004] (3) Longer time

steps were given for seeing the long time effects of the model and were presented in GR17 at Dublin. [SNP. Gupta,2004] (2) Ring formations were observed.

What we are doing here? We have to consider the gravitation effect of Universe on the test particle (1000 kg) at that moment at various places in solar system. For that we approximated the Universal gravitation effect on the test particle and calculated this effect with data of Planets, Sun, 'Near' stars starting from Proxima centaury, our Galaxy center, Milky way parts & globular clusters, Andromeda and Triangulum. Following Table 1 give the real data of the above mentioned astronomical bodies as on start of year 2000, at 0,0 hours. The position of a test particle of 1000 kg, is assumed to be near some planet. The xyz coordinates were assumed as 1.1 times the xyz coordinates of the planet and SITA calculations were done. Its position was changed near to another planet and another set of Calculations were done. The results were given Table 3.

Sl no	Name	Mass kg	HELIO CENTRIC ECLIPTIC XYZ VALUES solar sys as on 01.01.2000@00.00:00 hrs in METRE		
			xecliptic	yecliptic	zecliptic
1	test particle	1000	6.59107E+11	4.83056E+11	-16736558707
2	Mercury	3.3E+23	-24187692542	-65249363507	-3109906977
3	Venus	4.87E+24	-1.07543E+11	-336017352.1	6202877015
4	Earth	5.97E+24	-22638700013	1.45354E+11	0
5	Mars	6.42E+23	2.07862E+11	-5408501462	-5222124226
6	Jupiter	1.9E+27	5.99188E+11	4.39142E+11	-15215053370
7	Saturn	5.68E+26	9.62414E+11	9.78417E+11	-55378479488
8	Uranus	8.68E+25	2.15745E+12	-2.05491E+12	-35636913553
9	Neptune	1.02E+26	2.51232E+12	-3.73768E+12	19063604286

10	Pluto	1.27E+22	-1.50634E+12	-4.26077E+12	2.67229E+11
11	Moon	7.35E+22	-22997478408	1.45194E+11	34708814.69
12	SUN	1.99E+30	1	1	1
13	near star	3.97658E+29	-3.07379E+16	-2.48085E+16	5.99014E+15
14	near star	1.88888E+30	-1.70141E+16	-4.49612E+13	3.79378E+16
15	near star	2.18712E+30	-1.71774E+16	-1.53305E+14	3.78638E+16
16	near star	7.95317E+29	-1.85801E+15	1.6393E+15	-5.61485E+16
17	near star	8.94731E+29	9.02924E+15	-7.13182E+15	-7.77879E+16
18	near star	1.73976E+31	-3.1682E+16	-2.99664E+16	6.86968E+16
19	near star	8.94731E+29	2.37665E+16	-7.07555E+15	8.82862E+16
20	near star	1.88888E+30	9.77757E+16	-1.69837E+16	3.32855E+15
21	near star	8.94731E+29	-1.75629E+16	-2.0874E+16	9.78004E+16
22	near star	3.97658E+29	3.82107E+16	6.00795E+16	7.44241E+16
23	near star	1.82923E+30	-4.50486E+16	3.01003E+16	9.28066E+16
24	near star	3.28068E+30	-8.42312E+15	5.24915E+16	-9.39112E+16
25	near star	1.19298E+30	-4.60396E+16	3.03873E+16	9.29744E+16
26	near star	7.95317E+29	4.90495E+16	9.64605E+16	7.35909E+15
27	near star	8.94731E+29	4.99158E+16	9.78689E+16	7.06783E+15
28	near star	7.95317E+29	-1.39114E+16	-1.09124E+17	4.36506E+15
29	near star	1.82923E+30	-6.28738E+16	-8.89396E+16	-2.56335E+16
30	near star	2.18712E+30	-6.90623E+16	-8.50246E+16	2.58319E+16
31	near star	3.97658E+29	-2.35768E+16	2.08864E+16	1.10275E+17
32	near star	7.95317E+29	1.86257E+16	-5.54342E+16	-1.01576E+17
33	near star	8.94731E+29	-5.04468E+16	3.78032E+16	-1.03142E+17
34	near star	1.19298E+30	2.09805E+16	-4.31965E+16	-1.11915E+17
35	near star	5.96488E+29	-3.34107E+16	-3.81344E+16	1.12791E+17
36	near star	5.96488E+29	1.20105E+17	-5.23499E+15	-4.10595E+16
37	near star	8.94731E+29	-5.81398E+16	4.54439E+16	-1.08443E+17
38	near star	6.95902E+29	-1.07352E+17	7.50846E+16	-1.2264E+16
39	near star	9.94146E+29	2.96095E+16	1.22996E+17	4.58116E+16
40	near star	2.90291E+30	8.24904E+16	-2.35538E+16	-1.05478E+17
41	near star	8.94731E+29	-6.10305E+16	4.80435E+16	-1.15415E+17
42	near star	8.94731E+29	9.76996E+16	2.14625E+16	-9.75422E+16
43	near star	7.95317E+29	2.15194E+16	1.34558E+17	-3.20268E+16
44	near star	5.64675E+30	-5.35209E+16	-2.81642E+16	-1.29127E+17
45	near star	6.95902E+29	1.14625E+16	1.39712E+16	-1.43945E+17
46	near star	8.94731E+29	-1.32781E+17	1.60851E+16	-6.59031E+16
47	near star	1.19298E+30	-4.78813E+16	9.19484E+16	-1.08903E+17
48	near star	1.65028E+30	1.04974E+16	-1.34655E+17	-7.02332E+16
49	near star	8.94731E+29	-4.59519E+16	8.94752E+15	1.44982E+17
50	near star	5.96488E+29	1.36804E+17	5.36738E+16	-5.10992E+16

51	near star	2.00817E+30	1.77107E+16	2.7082E+16	-1.52249E+17
52	near star	8.94731E+29	-1.0952E+17	9.68318E+16	5.3829E+16
53	near star	1.88888E+30	-4.72306E+16	-1.16764E+17	9.36129E+16
54	near star	5.09003E+30	9.79121E+16	-9.2465E+16	8.39443E+16
55	near star	3.97658E+29	1.09829E+17	9.70466E+16	6.62157E+16
56	near star	7.95317E+29	-9.10748E+16	-1.36971E+17	-2.48893E+16
57	near star	1.09356E+30	-7.0043E+16	9.14497E+16	1.2171E+17
58	near star	5.96488E+29	-2.64948E+16	4.32255E+16	1.61635E+17
59	near star	1.49122E+30	-3.16721E+16	1.25283E+17	1.1067E+17
60	near star	7.95317E+29	4.73982E+16	1.59067E+15	1.63433E+17
61	near star	5.96488E+29	1.20195E+17	-9.0224E+16	8.74395E+16
62	near star	8.94731E+29	-5.75703E+16	-1.4009E+17	8.88539E+16
63	near star	7.95317E+29	6.76572E+16	-4.60048E+16	-1.57068E+17
64	near star	2.12747E+30	-9.2162E+16	-1.20447E+17	9.30606E+16
65	near star	8.94731E+29	5.72296E+15	1.76608E+17	-2.27853E+16
66	near star	5.96488E+29	-1.34996E+17	-1.16182E+17	-1.30636E+16
67	near star	5.96488E+29	-1.19512E+17	4.88067E+16	-1.2445E+17
68	near star	9.94146E+29	7.87302E+16	1.638E+16	-1.62411E+17
69	near star	1.82923E+30	3.91777E+16	1.47326E+17	-9.98492E+16
70	near star	6.95902E+29	1.67294E+17	-1.18466E+16	-7.32836E+16
71	near star	8.94731E+29	-1.39077E+17	-9.10857E+16	7.67253E+16
72	near star	2.78361E+30	5.24234E+16	-1.59364E+16	1.75315E+17
73	near star	1.65028E+30	3.6434E+15	2.91335E+16	-1.81794E+17
74	near star	9.94146E+29	-9.07771E+16	1.01639E+17	1.23937E+17
75	near star	1.88888E+30	6.41076E+15	1.79687E+16	-1.83691E+17
76	near star	1.88888E+30	-2.06314E+15	-5.39393E+15	1.86646E+17
77	near star	2.18712E+30	1.0974E+17	-3.31921E+16	1.4771E+17
78	near star	2.18712E+30	-1.54154E+17	-1.01333E+17	3.85252E+16
79	near star	5.96488E+29	4.30221E+16	-1.83542E+17	8.55871E+15
80	near star	9.94146E+29	-1.30645E+17	6.84493E+16	-1.20949E+17
81	near star	1.09356E+30	-1.31276E+17	6.75268E+16	-1.20784E+17
82	near star	1.19298E+30	-1.33898E+17	-5.20951E+16	1.2578E+17
83	near star	1.09356E+30	-2.19059E+16	6.93128E+16	-1.77114E+17
84	near star	1.49122E+30	3.99999E+16	8.00904E+16	1.70731E+17
85	near star	6.95902E+29	-2.19758E+16	-1.28321E+16	-1.9175E+17
86	near star	1.09356E+30	-1.3524E+17	-5.38681E+16	1.27447E+17
87	near star	8.94731E+29	-2.07383E+16	-9.28974E+15	1.93754E+17
88	near star	5.96488E+29	1.01434E+17	8.45481E+16	1.45159E+17
89	near star	5.96488E+29	7.37726E+16	-5.17702E+16	-1.79009E+17
90	near star	1.82923E+30	-1.50711E+17	6.46728E+16	1.16827E+17
91	near star	6.95902E+29	-3.30768E+16	-1.22256E+17	-1.58766E+17

92	Glob Clus Group	1.20578E+37	-1.16925E+21	-1.04245E+21	9.31497E+19
93	Glob Clus Group	7.43305E+36	-1.79414E+20	-3.61781E+20	-1.42253E+19
94	Glob Clus Group	9.58802E+36	1.48744E+19	2.77665E+19	-7.91706E+19
95	Glob Clus Group	7.05555E+36	6.94375E+19	-4.44352E+18	7.944E+17
96	Glob Clus Group	6.46631E+36	9.11252E+19	-4.39257E+19	1.89032E+20
97	Glob Clus Group	7.23385E+36	1.05314E+20	2.06504E+19	8.97721E+19
98	Glob Clus Group	6.79923E+36	1.25702E+20	6.15542E+19	3.76993E+19
99	Glob Clus Group	8.07244E+36	1.5288E+20	2.40773E+19	-1.58338E+19
100	Glob Clus Group	9.57827E+36	1.74887E+20	1.35743E+19	-3.13919E+19
101	Glob Clus Group	8.2981E+36	1.85602E+20	5.87126E+19	1.50955E+19
102	Glob Clus Group	1.03904E+37	2.00762E+20	1.02368E+20	7.89348E+19
103	Glob Clus Group	8.99599E+36	2.21232E+20	1.03194E+19	-1.15685E+20
104	Glob Clus Group	8.5572E+36	2.40926E+20	2.38732E+19	8.08095E+18
105	Glob Clus Group	9.81786E+36	2.52521E+20	-1.04214E+19	-1.90968E+18
106	Glob Clus Group	9.86105E+36	2.63724E+20	1.58631E+19	2.36248E+19
107	Glob Clus Group	8.93192E+36	2.80244E+20	4.57404E+18	-5.62166E+18
108	Glob Clus Group	1.00965E+37	2.93615E+20	-2.52379E+19	6.36066E+18
109	Glob Clus Group	1.37127E+37	3.13834E+20	-1.18077E+18	1.46617E+19
110	Glob Clus Group	1.01466E+37	3.35306E+20	-1.68075E+20	-3.47826E+19
111	Glob Clus Group	1.11914E+37	3.72364E+20	1.37362E+19	-1.25647E+20
112	Glob Clus Group	1.02218E+37	4.87315E+20	1.74393E+20	8.66073E+19
113	Glob Clus Group	9.30663E+36	6.49171E+20	1.82615E+18	9.06719E+19
114	Glob Clus Group	9.89727E+36	1.0232E+21	1.53107E+20	4.80442E+20
115	Galaxy center	7.164E+36	4.79211E+19	1.67483E+20	1.56991E+20
116	Milkyway part	3.84731E+40	-1.63642E+20	1.47838E+20	-7.97417E+19
117	Milkyway part	4.80914E+40	1.54517E+20	8.22578E+19	1.56049E+20
118	Milkyway part	5.77096E+40	-1.14673E+19	4.68166E+19	2.29499E+20
119	Milkyway part	6.73279E+40	-8.86592E+19	-1.0611E+19	2.16841E+20
120	Milkyway part	7.69462E+40	5.62463E+19	-1.61296E+20	-1.60665E+20
121	Milkyway part	8.65645E+40	-1.1565E+20	2.03896E+20	6.68227E+18
122	Milkyway part	9.61827E+40	-3.63423E+19	1.12347E+19	-2.31401E+20
123	Milkyway part	1.05801E+41	-1.72238E+20	-7.67886E+19	1.39394E+20
124	Milkyway part	1.05801E+41	-2.05075E+19	-2.19577E+20	7.97417E+19
125	Milkyway part	9.61827E+40	-1.58373E+20	7.45639E+19	-1.56049E+20
126	Milkyway part	8.65645E+40	-3.06445E+19	-3.72049E+19	-2.29499E+20
127	Milkyway part	7.69462E+40	6.156E+19	-6.46792E+19	-2.16841E+20
128	Milkyway part	6.73279E+40	9.55613E+19	1.41591E+20	1.60665E+20
129	Milkyway part	5.77096E+40	2.32564E+20	-2.93704E+19	-6.68227E+18
130	Milkyway part	4.80914E+40	3.07501E+19	2.23922E+19	2.31401E+20
131	Milkyway part	3.84731E+40	4.15581E+19	1.83944E+20	-1.39394E+20
132	Andromeda	1.4129E+42	1.74266E+22	1.50487E+22	6.79254E+21

133	Triangulum Galaxy	1.41E+41	1.28546E+20	1.93083E+22	-1.82029E+22

Table 1 shows the masses (kg) and positions (HELIO CENTRIC ECLIPTIC XYZ coordinates) of Planets, Near Stars, Globular clusters groups, Milky way parts, Andromeda Galaxy and Triangulum Galaxy. We grouped these globular clusters, and resulting Center of gravities and masses were taken for the ease of number of available positions in SITA simulations.

4.1 Planets, Near Stars and Globular Cluster Data:

Table 1 gives masses, positions in HELIO CENTRIC ECLIPTIC XYZ coordinates of Planets, moon, Sun, near stars, Galaxy center, Globular cluster Groups, Andromeda, Milky way and Triangulum Galaxies. The distance component XYZ in a Sun-centered coordinate system, in kilo-parsecs (kpc), later converted to meters, where X points toward the Galactic center, Y points in the direction of the Galactic rotation, and Z points towards the North Galactic Pole.

We grouped these globular clusters, and resulting Center of gravities and masses were taken for the ease of number of available positions in SITA simulations. Globular cluster distances, directions etc taken from NASA's GSFC [100]. Results from heasarc_globclust: Milky Way Globular Clusters Catalog (February 2003 Version) S.Samurovic et al [72A], Mond [39] vs Newtonian dynamics GC, A&A accpted Nov 5, 2008. The distance component XYZ in a Sun-centered coordinate system, in kiloparsecs (kpc), where X points toward the Galactic center, Y points in the direction of the Galactic rotation, and Z points towards the North Galactic Pole. Coordinate system: Equatorial.

Here basically we wanted to use the same setup and algorithm used for the Galaxy missing mass problem, such that we can compare the various results of this SITA algorithm. Masses were estimated using the luminous content for near stars and Globular Clusters. Reference is Binny Text book [41]. For Sun, Planets, Moon, Galaxy center, Milky Way, Andromeda and Triangulum Galaxy masses were taken from Wikipedia and other sources.

	Test Particle position XYZ in solar System			Acceleration experienced by Test Particle					Difference =
								Sun accl due	Sun accl (g) -
	x	y	z	x	y	z	Total xyz	to Gravity=	Experienced accl
Mercury	6.59107E+11	4.83056E+11	-16736558707	-0.00785033	-0.021177324	-0.001009354	0.022608086	0.022607641	-4.44202E-07
Venus	-1.18298E+11	-369619087.3	6823164717	-0.009440299	-2.94475E-05	0.000544499	0.009456034	0.009453228	-2.80611E-06
Mars	2.28648E+11	-5949351608	-5744336649	0.002533938	-6.60831E-05	-6.36595E-05	0.002535599	0.002535578	-2.11409E-08
Jupiter	6.59107E+11	4.83056E+11	-16736558707	0.000178844	0.000131063	-4.53527E-06	0.000221773	0.000198688	-2.30844E-05
Saturn	1.05865E+12	1.07626E+12	-60916327437	4.24362E-05	4.31791E-05	-2.4413E-06	6.05906E-05	5.8145E-05	-2.44565E-06
Uranus	2.37319E+12	-2.2604E+12	-39200604908	9.1692E-06	-8.41232E-06	-1.52879E-07	1.24445E-05	1.23553E-05	-8.91522E-08
Neptune	2.76355E+12	-4.11145E+12	20969964715	3.2072E-06	-4.3602E-06	1.89918E-08	5.41274E-06	5.40848E-06	-4.26644E-09
	Table 3 : Xyz Positions and accelarations of test particle, Accelaration due to gravity of SUN at that point and								
			Resulting exess accelation towords SUN						

5. Singularities:

The above sets of equations were used tested many times for calculating different positions in SITA simulations starting with different initial conditions in xyz and time coordinates using some near real values of distances. THEY NEVER GAVE ANY SINGULARITY or any divided by zero error. These equations were tested for a large range of +/- 1e50 meters for xyz coordinate values upto +/- 1e25 seconds for time values. All the equations are working in unison and giving good results. About 15 Digit Accuracies are used through out the calculations and

repeatability of getting same number is good in the computer programs and algorithms.

6. Dynamic Universe Model: EVIDENCES:

Presence of Blue shifted galaxies in the universe, is the main evidence. HUBBLE DEEP SPACE houses thousands of Blue shifted Galaxies which is one of the greatest mysteries for expanding universe models could not explain.

Our galaxy the Milky way is moving with a speed 454 ± 125 km/sec towards l=63° ± 15° and b=-11° ± 14°relative to distant part of samples and 474 ± 164 km/sec towards l=167° ± 20° and b=5° ± 20°relative to nearer part of samples. (JV.Narlikar, (1983)[42]). The local group comprising of Milky way, NGC6822, Andromida galaxy and other dwarf elliptical galaxies, Magellanic clouds rotate about their centers and revolve around a common center. S.M.Faber and David Burstain (1988) in their paper " Motions of galaxies in the neighborhood of Local group " {presented in a symposium,' Large scale motions of universe' Princeton 1988,p118} described the STREEMING motions towards the Great Attractor (located at l =309° and b=+18°) by the local group, Virgo cluster, Ursa major,

Centaurus, Camelopardalis, Perseus-Pisces etc ., clusters with speeds ranging up to 1000km/sec. PLEASE NOTE THE DIFFERENCE IN DIRECTIONS OF MOVEMENT AS WELL AS SPEEDS. All these clusters form a super cluster which also rotate and revolve about each other.. Groups of super clusters form Filament structures and to grate walls and so on. This is how our universe is LUMPY and anisotropic even at large scale.

Another piece of supporting evidence for the Dynamic Universe Model was there. There is a considerable discussion was as to whether GA: the Great attractor exists at all. For example D.A. Mathewson, V.L. Ford, M. Buckhorn have measured the peculiar velocities 1355 spiral Galaxies. They find no backside in fall into GA region, rather a bulk flow of about 400 km/sec on the scales of 100 h_o^{-1} MPC. Thus there is a considerable doubt about the existing of an attracting mass there. Both the parties find STREEMING MOTIONS OR BULK FLOW. IF THERE IS NO attracting MASS, THEN WHY THEY ARE MOVING? *THIS SUPER CLUSTER MUST BE IN REVOLUTION MOTION.*

Birch (1982)[12,13], has discovered the asymmetric distribution of the angles of rotation of polarization vectors of 132 radio sources and tried to explain this via the Global rotation. We think that the asymmetric distribution of the angles of rotation of polarization vectors is due to the galaxies or parts of clusters revolving in different directions. Authors like Diaferio [25], Burbidge [17],

Burko[18] Cerruti-sola et al [19] , Chavanis [21], de Bernardis P[24], will make good introduction for further study in different aspects of this subject. To further widen the subject one should have a look at Aristotle [8], Jeans [43], Gödel [33], Hawking [34, 35, 36], Phinney et al[69], Senovilla [77], Miller A.D et al [59], Noerdlinger [63], Padmanabhan [64], etc..

7. Dynamic Universe Model: Conclusion

We proposed a practical Dynamic Universe Model, which we feel it is sufficient for most of the purposes. If the some people feel, a universe model should discuss about the origin of universe, we feel sorry for them. They're no Bigbang here. This Universe is continuously moving, but going nowhere! Statistical properties are same in the past and in the future.

8. Pioneer anomaly Results:

Table 3 gives the results of these calculations. The xyz positions of test particle and the acceleration experienced by it in the xyz coordinated are given in that table. The resulting vectorial acceleration towards SUN experienced by the test particle was given in the column 'Total xyz'. The actual acceleration due to gravity of SUN at that point is given in the next column. The difference between

these two columns gives the final actual difference between these two accelerations. The minus sign indicate that this acceleration is towards SUN. Please see again the Abstract as well as in this column in Table 3 in this paper and watch the values after different planets. See the different values. They don't follow just any increasing or decreasing order. Some times my Laptop took more than half an hour in a non stop way for a set of calculations required for 100 seconds interval. There was never a divide by zero error. These are results of SITA simulations.

All the calculations were done using 133 masses using the same algorithm used for earlier results. This was done with a particular purpose in mind to see the working of algorithm with same number of particles. And the results were extremely encouraging. Always similar pictures formed same mutual Orbits in three dimensions showing good orbiting nature of the universe. Super computers and accurate estimations of masses depending on the Luminosities can give more accurate results. And can take up more number of particles and show the non-uniform nature of the universe in a greater detail in a much faster manner.

Irrespective of time step for calculations, and various initial positions of masses, the final stabilized formations of masses were similar. The higher the distance between the masses like mega great walls, the faster the movements are.

That is also a similar result in the present universe. The extremely distant galaxies are moving faster with huge red and blue shifts and with higher velocities.

9. Acknowledgements

Almighty Goddess VAK continuously guided this research. We thank Almighty Hanuman for giving me the strength to complete the paper. We thank my wife Savitri for her support by relieving me from house hold work during this period. We also thank the service in providing me the reprints of many papers by the IUCAA library through COPS services.

10. References:

[1] A lengthy survey of several years of debate by the authors of the original 1998 paper documenting the anomaly. The authors conclude, "Until more is known, we must admit that the most likely cause of this effect is an unknown systematic. (We ourselves are divided as to whether 'gas leaks' or 'heat' is this 'most likely cause.')"

Wikipedia http://en.wikipedia.org/wiki/Pioneer_anomaly

[2] Adi Nusser, 2002, MNRAS, 331, 909-916.

[3] Aguirre, A. & Steven Gratton, PRD, Vol 65, 2002, 083507

[4] Anderson et al, (preprint) A Mission to Test the Pioneer Anomaly, Int.J.Mod.Phys. D11 (2002) 1545-1551

[5] Anderson, et al. (preprint) "Study of the anomalous acceleration of Pioneer 10 and 11". Phys. Rev. D 65, 082004 (2002)

[6] Anderson, John D. , Philip A. Laing, Eunice L. Lau, Anthony S. Liu, Michael Martin Nieto, Slava G. Turyshev (1998) [6,70,78]. "Indication, from Pioneer 10/11, Galileo, and Ulysses Data, of an Apparent Anomalous, Weak, Long-Range Acceleration". Phys. Rev. Lett. 81: 2858–2861. doi:10.1103/PhysRevLett.81.2858, http://prola.aps.org/abstract/PRL/v81/i14/p2858_1. (preprint)

[7] Antonio F. Ranada (10 Jan 2005). "The Pioneer anomaly as acceleration of the clocks" Retrieved on 2008-05-13. See also Wikipedia

[8] Book on Aristotle 1952

[9] Bahcall N., J.P. Ostriker, S. Perlmutter et al,., P. J. Steinhardt, For a review see, Science, 284, 1481, (1999).

[10] BAUT forums :Dense mass equations and missing mass: (http://www.bautforum.com/against-mainstream/64504-densemass-equations.html#post1077177)

[11] Benson A.J., Cole S., Frenk C.S., Baugh C. M., Lacey C.G. 2000, MNRAS, 311, 793.

[12] Birch P. (1982), Nature 208, 451

[13] Birch P. (1983), Nature 301, 736

[14] Bowen. R., And P. G. Ferreira , PRD, 66, 2002, 041302®

[15] Broadhurst, T. J., Ellis, R. S. , Koo, D.G., and Szalay, A. S., (1990), Nature, 343, 726.

[16] Brownstein J. R. and J. W. Moffat (2006). "Gravitational solution to the Pioneer 10/11 anomaly". Classical and Quantum Gravity 23: 3427–3436. doi:10.1088/0264-9381/23/10/013. . Arxiv.org Preprint (gr-qc/0511026)

[17] Burbidge, G. in ‘ Cosmological parameters and Evolution of the universe,’ proceedings of the IAU symposium No183, Kyoto, Japan, 1997, Edited by Katsuhiko Sato (Kluwer Academic, Dordrecht, 1999)

[18] Burko. L.M., A. I. Harte., E. Poisson, In PRD, vol 65, 2002, 124006

[19] Cerruti-sola M., P. Cipriani, M. Pettini, Astron- Astro Phy, 328, 339 (2001)

[21] Chavanis, P.H. Astron- Astro Phy, 381, 371 (2002).

[22] Computer sleuths try to crack Pioneer anomaly See Wikipedia

[23] David Harris Pioneer spacecraft a step closer to being boring, April 13th, 2008, See Wikipedia^

[24] de Bernardis P. et al, Nature London, 404, 955, 2000

[25] Diaferio A., Kauffmann. G, Balogh M. L., White S.D.M., Schade., Ellingson E., 2001, MNRAS, 323, 999.

[26] Dittus et al (preprint) A Mission to Explore the Pioneer Anomaly,. (2005)

[28] Einstein, A. 1911, "On the influence of Gravitation on the propagation of light", Methuen and company, 1923, Reprinted, Dover publications, 1952, New York, USA.

[29] Einstein, A. 1916, "The foundation of General theory of relativity ", Methuen and company, 1923, Reprinted, Dover publications, 1952, New York, USA.

[30] Einstein, A. 1917, “Cosmological considerations of General theory of relativity ”, Methuen and company, 1923, Reprinted, Dover publications, 1952, New York, USA.

[31] Erhard Scholz (14 August 2007). "Another look at the Pioneer anomaly" Retrieved on 2008-05-13. See Wikipedia^ also.

[32] F.J. Oliveira. "Is the Pioneer anomaly a counter example to the dark matter hypothesis?". Int. Jour. Theo. Phys. DOI:10.1007/s10773-007-9434-y (2007). See Wikipedia ^ also.

[33] Gödel . K.(1949) Rev. Mod. Phy. 21, 447.

[34] Hawking .s and R. Penrose, 1996, The nature of space time, Princeton University press, Princeton.

[35] Hawking S.W. and G.F.R. Ellis 1973, ‘ The large scale structure of space time’, Cambridge university press.

[36] Hawking, S.W. MNRAS 142, 129, (1969).

[37] Hoyle, F. MNRAS, 108,372(1948).

[38] Hymn of Creation in Rugveda sloka (10-129-1) to sloka (10-129-7)

[39] Jacob D. Bekenstein. "The modified Newtonian dynamics- MOND - and its implications for new physics". Contemporary Physics 47, 387 (2006). Retrieved on 2007-10-01. See Wikipedia also.

[40] Jambrina, L.F. L.M.G. Romero, PRD 66, 2002, 024027

[41] James Binny, Scott Tremaine in Galactic Dynamics 1987,Princeton Uty Press, Princeton New Jersey, USA.

[42] Jayant. V. Narlikar 1983, 'Introduction to cosmology', Cambridge University press, In India Foundation books 2/19 Ansari Road, Daryaganj New Delhi-110002.

[43] Jeans J.H., 1919, Phyl.Trans.Roy.Soc. , London, A 218,157.

[44] John D. Anderson, Eunice L. Lau, Giacomo Giampieri. "Improved Test of General Relativity with Radio Doppler Data from the Cassini Spacecraft". Note: The corresponding arXiv pre-print John D. Anderson, Eunice L. Lau, Giacomo Giampieri. "Improved Test of General Relativity with Radio Doppler Data from the Cassini Spacecraft". was withdrawn. See also Wikipedia

[45] John M.V., K.B. Joseph, PRD, Vol 61, 2000, 087304

[46] Kauffmann. G, Nusser. A., Steinmetz. M., 1997, MNRAS, 286, 795.

[47] Korotky V. A., Yu. N. Obukhov, (1996), In Gravity Particles and Space time- edited by P. Pronin, and G. Sardanashvly, (world Scientific, Singapore) p 142. also preprint gr-qc / 9604049

[48] Korotky V.A., Yu. N. Obukhov, (1994), Gen. Rel. Grav. 26, 429.

[50] Layman's article "Opening New Doors", Seattle Times

[51] Li-Xin Li, (1998), Gen. Rel. Grav. 30, No3, page 497.

[52] Lorenz, Einstein, Minkowski&Hweyl-1923 The principle of relativity, Methuen and company, 1923, Reprinted, Dover publications, 1952, New York, USA

[53] Lorenzo Iorio '(Preprint) Can the Pioneer anomaly be of gravitational origin? A phenomenological answer' See also ^ Wikipedia

[54] M.E.McCulloch. "Modelling the Pioneer anomaly as modified inertia". MNRAS 376, 338-342 (2007). Retrieved on 2007-10-02. See Wikipedia also ^.

[55] M.Milgrom. "The Modified Dynamics as a vacuum effect" Phys. Lett. A253 (1999). Retrieved on 2007-10-03. ^ See Wikipedia also.

[56] Masreliez C. J., *The Pioneer Anomaly - A cosmological explanation*. (2005) Ap&SS, v. 299, no. 1, pp. 83-108

[57] McCulloch. M.E. "Modelling the flyby anomalies using a modification of inertia.". MNRAS-letters, 389(1), L57-60. See Wikipedia ^ also.

[58] Michael Martin Nieto. "New Horizons and the Onset of the Pioneer Anomaly". See Wikipedia ^ also.

[59] Miller A. D. et al, Astrop, J. Lett. 524, L1, !999.

[60] ^ NASA Baffled by Unexplained Force Acting on Space Probes See also Wikipedia

[61] Nieto & Turyshev Finding the origin of the Pioneer anomaly, (2004), Class. Quantum Grav. 21 4005-4023

[62] Nieto M. M., J. D. Anderson (preprint) Using Early Data to Illuminate the Pioneer Anomaly, (2005). Class. Quantum Grav. 21 4005-4023

[63] Noerdlinger, P.D. and Petrosian, V.,. "The Effect of Cosmological Expansion on Self-Gravitating Ensembles of Particles,", pp. 1,. See also Wikipedia

[64] Padmanabhan T., Phys. Rep. 188, 286, (1990)

[65] Paul J. Steinhardt,, Neil Turok, 2002, PRD, Vol 65, 126003

[66] Paul J. Steinhardt,, Neil Turok, hep-th 0111030

[67] Pavelkin. V.N, and Panov V.F. (1995), Int. J. Mod. Phy. D4, 161.

[68] Perlmutter S. et al, Astro-ph, / o812133,1998.

[69] Phinney, E.S., and Webster, R. L., (1983), Nature, 301, 735.

[70] Pioneer Anomaly Project Update: by Slava G. Turyshev, March 28, 2007 See also Wikipedia ^ Pioneer Anomaly Project Update: A Letter From the Project Director

[71] Pioneer Explorer Collaboration See also Wikipedia

[72] Robert Temple (2003), Astrophysics and space sciences285; pages 471-477, 2003 Further rotation curve of the Galaxy can be found at the following link : http://abyss.uoregon.edu/~js/images/Gal_rotation.gif

[72A] Samurovic s. et al, Milky Way Globular Clusters Catalog (February 2003 Version) Ref: 0811.0698v1 Arxiv.

[73] Saulo Carneiro,, PRD, (2000), Vol 61, 083506

[74] Scheffer (preprint) Conventional Forces can Explain the Anomalous Acceleration of Pioneer 10, , Phys.Rev. D67 (2003) 084021 One of several

arguments that the "Pioneer Anomaly" can be well explained by conventional physics.

[75] Scientific American, vol 279, #6, December 1998, 26-27.

[76] Scientific American, vol 293, #4, October 2005, 24-25.

[77] Senovilla, J.M.M. Phy. Rev. Letter. 64, 2219 (1990).

[78] Slava G. Turyshev, Michael Martin Nieto, and John D. Anderson [8] A Route to Understanding of the Pioneer Anomaly, (2004)

[79] SNP. Gupta, 'Absolute Rest frame of reference is not necessary', presented in Symposium on Early Universe SEU, Dec 20-22; 1994, IIT, Madras, India, Proceedings Page 54.

[80] SNP. GUPTA :'Multiple bending of light ray can create many images for one Galaxy: in our dynamic universe- A computer simulation' presented in SIGRAV, 18-22 September 2000 , Italy; Edited by R. Cianci, R. Collina, M. Francaviglia, and P. Fré (Eds) in Book "Recent Developments in General relativity Genoa 2000" published by Springer-Verlag Italia, Milano 2002, Page 389.

[81] SNP. GUPTA in ICDGR 12 International Conference on Differential Geometry and General Relativity 2012, Paper on "Introduction to Dynamic

universe model" oral presentation done Nov20-22 2012, Mathematics Dept, Aligarh Muslim University, Aligarh 202002, India

[82] SNP.GUPTA, Book1. Dynamic Universe Model: A singularity-free N-body problem solution [ISBN 978-3-639-29436-1]---2010 October---- VDM Germany

https://www.morebooks.de/store/gb/book/dynamic-universe-model/isbn/978-3-639-29436-1

http://vaksdynamicuniversemodel.blogspot.in/p/books-published.html

[83] SNP. Gupta: Chairing a 6 hour session In National Seminar on Mathematics, BIT, Durg, on 15th -16th March 2013, Chaired a 6 hour session and Presented Two papers in Math seminar " AICTE sponsored National Seminar on Application of mathematical Modelling in science and technology"held at Bhilai institute of Technology , Durg, during 15th -16thMarch 2013. Papers by SNP Gupta are: (1). Dynamic Universe Model explains discrepancies of Very Long Base line Interferometry (2). An introduction to Dynamic Universe Model

[84] SNP. Gupta: Three Papers are presented at Cospar 2012 http://www.cospar2012india.org/Default.aspx http://www.cospar-assembly.org/ three papers:------- (1). Oral in Fundamental Physics in

Space (H)- Study of Strong Gravity Using Gravitational and Electromagnetic Waves (H0.2) - .COMBINING MICRO AND MACRO WORLDS IN DYNAMIC UNIVERSE MODEL| EXPLAINS VLBI OBSERVATIONS….H0.2-0010-12- room G005 Tue july 17 1430--- (2). Oral in Panels (P) Satellite Dynamics for Earth and Solar System Sciences and Applications (PSD.1) DYNAMIC UNIVERSE MODEL PREDICTS THE TRAJECTORY OF NEW HORIZONS SATELLITE GOING TO PLUTO.....PSD1-0012-12 room G001 Tue july 17 ------ (3). POSTER Fundamental Physics in Space (H) Dark Energy and Dark Matter (H0.1) SINGULARITY FREE N-BODY SIMULATIONS CALLED `DYNAMIC UNIVERSE MODEL' DON'T REQUIRE DARK MATTER H0.1-0023-12 POSTER room sun-sat july 15 1600

[85] SNP.Gupta : AICON-2013, CSIT, Durg ...Accepted the Paper "Dynamic Universe Model explains the Discrepancies of Very-Long-Baseline Interferometry Observations." and Invited for Oral Presentation, during April 12th-13th, 2013 at AICON-2013, CSIT, Durg.

[86] SNP.Gupta : FQXi-2013, 'It from Bit or Bit from It' ...Accepted paper "Information, Reality and Relics of Cosmic Microwave Background" on Apr. 26, 2013 @ 18:25 GMT, see http://fqxi.org/community/forum/topic/1607

[87] SNP.GUPTA, “DYNAMIC UNIVERSE MODEL of cosmology: Missing mass in Galaxy” Presented at OMEG05 Origin of Matter and Evolution of Galaxies, November 8-11, 2005 at Koshiba Hall, University of Tokyo, Tokyo.

[88] SNP.GUPTA, “DYNAMIC UNIVERSE MODEL of cosmology: Missing mass in Galaxy” Presented in 7th Astronomical conf by HEL.A.S,. Kefallinia, Greece 8-11,Sept, 2005

[89] SNP.GUPTA, “Missing mass in Galaxy using regression analysis in DYNAMIC UNIVERSE MODEL of cosmology” Presented at PHYSTAT05 Conference on 'Statistical Problems in Particle Physics, Astrophysics and Cosmology'' held in Oxford, UK on Sept 12th to 15th, 2005.

[90] SNP.GUPTA, DYNAMIC UNIVERSE MODEL of cosmology and SITA (Simulation of Inter-intra-Galaxy Tautness and Attraction forces with higher time step). This paper was formally presented in GR17; The 17th international conference on gravitation and relativity, in Dublin, Ireland, 18-24 July 2004.

[91] SNP.GUPTA, DYNAMIC UNIVERSE MODEL of cosmology and SITA (Simulation of Inter-intra-Galaxy Tautness and Attraction forces with variable time step). The simulations in above paper were changed to

small time steps and were accepted in British Gravity Meeting, in UK. 15-18 Sept 2004 the international conference on gravitation.

[92] SNP.GUPTA, DYNAMIC UNIVERSE MODEL of cosmology and SITA (Simulation of Inter-intra-Galaxy Tautness and Attraction forces). Presented in ICR 2005 (International Conference on Relativity) , at Amravati University , India, Jan 11- 14, 2005 .

[93] SNP.GUPTA, MULTIPLE BENDING OF LIGHT RAY IN OUR DYNAMIC UNIVERSE; A COMPUTER SIMULATION. Gr15: 15th international conference on gravitational conference on gravitation and relativity, pune, India. 16-21 DEC 1995\7. P116; a6.32 (1997)

[94] SNP.GUPTA: Gave lecture about Blue Shifted Galaxies in Digvijay College Rajnadgaon, CG, INDIA, to the mathematics professors and students and other prof on 4th April 2013.

[95] SNP.GUPTA: Invited talk in Conference on “Emerging Areas in Pure & Applied Mathematics” held on 25-26 Nov, 2011at Kalyan P.G. Autonomous College Bhilai, C.G., INDIA, on “Tensors without Differential and Integral equations used in Dynamic Universe Model”

[96] SNP.GUPTA, Book2. Dynamic Universe Model: SITA singularity free software ---2011 March --- VDM n Germany, March- 2011, ISBN 978-3-639-33501-9,

https://www.morebooks.de/store/gb/book/dynamic-universe-model/isbn/978-3-639-33501-9

[97] SNP.GUPTA, Book3. Dynamic Universe Model: SITA software simplified [ISBN 978-3-639-36469-9]---Aug-2011----VDM Germany

https://www.morebooks.de/store/fr/book/dynamic-universe-model/isbn/978-3-639-36469-9

[98] SNP.GUPTA 4th Book: SITA: Dynamic Universe Model: Blue Shifted Galaxies Prediction Published (ISBN 978-3-8484-1382-9), 2012 Book is available from

https://www.morebooks.de/search/gb?utf8=%E2%9C%93&q=978-3-8484-1382-9

[99] Yu. N. Obukhov, GRG, 1992, Vol 24, No2 , Page 121.

[100] http://heasarc.gsfc.nasa.gov/W3Browse/star-catalog/globclust.html

-=*****=-

Running head

DynamicUniverseModel clear PioneerAnomaly

Title:

Mathematics of Dynamic Universe Model explain

Pioneer Anomaly

Corresponding Author:

SNP. Gupta[1,]

[1]*AGM (C&IT), Bhilai Steel plant; India,*

Mailing address*: SNP. Gupta, 1B, Street 57, Sector 8, Bhilai 490001, CG, India*

e-mail: [1]*snp.gupta@gmail.com*