Explaining near light velocities observed in Astronomical Jets using SITA simulations

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Abstract: Very high velocities like velocity of light are observed in astronomical jets from the centres of many Galaxies including our own Milkyway. The formation of such high velocity jet is explained using SITA simulations in this paper. For this purpose the velocity attained by a test neutron in the path traced by it is calculated and depicted using a setup of 133 bodies. This setup consisting of one densemass of the mass equivalent to Galaxy center, 90 stars with similar masses of stars near Galaxy center, mass equivalents of 23 Globular Cluster groups, 16 Milkyway parts, Andromeda and Triangulum Galaxies at appropriate distances.
The velocity of particle attained in the path by this test neutron was found to be very high as observed in an astronomical jet emerging from Galaxy center. Dynamic Universe model can be used for such an application.

Keywords: Dynamic Universe Model, Astronomical Jets, SITA simulations

1. Introduction:

Dynamic Universe model is a singularity free tensor based math model. There will not be any divided by zero errors, multiple real solutions or any other imaginary solutions for a single set of non-repetitive input data. The tensors used are linear without using any differential or integral equations. Only one calculated output set of values exists. Data means properties of each point mass like its three dimensional coordinates, velocities, accelerations and it's mass.

In this paper, a set of point masses consisting of Galaxy center of the Milkyway along with ninety numbers Wolf-Rayet stars is simulated. This whole set is under the continuous and Dynamical influence of twenty three Globular Cluster groups, sixteen Milkyway parts, Andromeda and Triangulum Galaxies at their appropriate distances from Sun. It is a total of 133 masses in this work. This Galactic center can be of any another Galaxy also but the outer parts will vary. The Dynamical gravitation effect of all this set of masses on a Test Neutron is calculated and depicted as graphs. Various cases of simulations and their output graphs are discussed in results section. All these masses were allowed to move according to the universal gravitation force (UGF) acting on each mass at that instant of time at its position. In other words each point mass is under the continuous and Dynamical influence of all the other masses. For any REAL N-body problem calculations, the more accurate our input data the better will the calculated results; one should take extreme care, while collecting the input data.

Basic constituent parts of this paper are I**nput data Collection**, **Procedure** for calculations, various simulations and their resulting output graphs in **Results** section, and lastly **Discussions** /**Conclusions**. In the 'Procedure for calculations' section a discussion can be seen about the total time taken for calculations and number of iterations in each type of simulations

The problem with such simulations is the overwhelmingly large amounts of output data. Each simulation gives 3 dimensional vector data of accelerations, velocities, positions for every point mass in every iteration in addition to many types of derived data. A minimum of 133 x 18 dataset of 16 decimal digits will be generated in every iteration. It is data and data everywhere. It is a huge data mine indeed.

2. Input Data Collection

For conducting these simulations / calculations using a N-body problem solution called Dynamic Universe Model is used. The required real observational data is collected from various sources. That included many research papers and web-pages. All these are referenced. Even Wikipedia also was checked many times for better understanding of some of the practices involved. .

2.1. Reference to coordinate system:

Sun was the reference as usual as in all papers. We will use HELIO CENTRIC ECLIPTIC XYZ coordinates of solar system as on 01.01.2000@00.00:00 hrs with Mass (kg) and Xecliptic, Yecliptic and Zecliptic (in Metre) are the coordinate axes. Here Mass of Sun is 1.99E+30 Kg. and Xecliptic, Yecliptic and Zecliptic coordinates are 0, 0 and 0 Metre.

Even though SUN is the reference it will not be used in the calculations as Sun is very far off from Galaxy center. The stars S1 to S100 will be staying in nearby locations to Galaxy (MILKY Way) center and they will be used in calculations. There is no Coordinate system which is centered on Milkyway center, which would have been a better choice for doing these calculations..

2. 2. Galactic Center:

The distance of Galactic Center is of the order of 26000 light-years from solar system. Its direction is having a Right Ascension of 17h 45m 40.045s and Declination of (-) 29° 0' 27.9". Its mass can be estimated as 4.1 million $M_\odot$ or about 8.2×10^{36} kg. The orbits of WR star S14 [16] specify that the radius is no more than 6.25 light-hours. In another paper its mass is of the order of 4.31 million $M_\odot$. Lower value of both the estimates is taken here. See the news from BBC by searching internet as "Black hole confirmed in Milky Way" on December 9, 2008. (Retrieved on December 10, 2008 nature/7774287) The author needs to say one more thing at this point, about the super massive Blackhole at the center of Milkyway according to BBC news. He could not find any further published paper about it on internet. Hence a densemass is selected instead of Blackhole. This paper requires only mass and coordinates of this densemass, size is not important for these calculations.

2.3. Wolf-Rayet stars (WR stars or Galaxy Center Stars):

2.3.1. Masses of WR stars near Galaxy core are named like S1,,,S100 etc. Their masses are simulated using the Excel formula

=1.99E+30*(RAND()*(24-16)+16) ….. (1)

This formula generates random numbers between 24 and 16. This generated random number is multiplied with solar mass of 1.99e30 kg to give a star mass which is minimum 16 times to 24 times solar mass.

2.3.2. Three dimensional coordinates of these WR-Stars are simulated using the following Excel formulae.

- For **xecliptic** the formula applied is **=$K$31*(RAND()*(0.00000478802)+1) ... (2)**
- For **yecliptic** the formula applied is **=$L$31*(RAND()*(0.00000478802)+1) ... (3)**
- For **zecliptic** the formula applied is **=$M$31*(RAND()*(0.00000478802)+1) ... (4)**

2.3.3. Distances of the above simulated stars are calculated using above simulated coordinates:

- For the **Distance**s the Excel formula used is **=((K32)^2+(L32)^2+(M32)^2)^0.5 … ... (5)**

2.4. Test Particle… Neutron:

2.4.1. Initial position and mass of the test particle. Neutron was chosen as it is electrically neutral. It is moving under the influence of UGF (Universal Gravitation Force) on its mass dynamically by all the other masses in this calculation. The mass of this was taken from Wikipedia. Position of Neutron was taken near the first Galaxy center star. A value of 1000000000 meters for x, 2000000000 m for y and for z 3000000000 meters were added to the coordinates of first star and these values were taken as initial x, y, z positions for the Neutron.

*2.4.2. Initial velocity f*or the Neutron: an initial velocity of 1% of velocity of light was taken. That is V= 30000km/s= 30000000 m /sec.

2.4.2.1. *Direction* of test Neutron is taken towards Milky Way center. The direction cosines are calculated using the formula for equation of line through point (x_0, y_0, z_0) and (x_1, y_1, z_1):

$$\frac{x-x_0}{x_1-x_0}=\frac{y-y_0}{y_1-y_0}=\frac{z-z_0}{z_1-z_0} \qquad \textbf{... (6)}$$

2.4.2.2. Initial calculated velocities

The calculated velocities for the Neutron directed from position of Neutron to Galaxy center are calculated for. ‘Xecliptic v, Yecliptic v and Zecliptic v’ as (-)3363.96588, (-) 25846.79996 and (-)14853.50684 M/Sec.

2.5. Time-step:
Time-step is the elapsed time between iterations. Sometimes a time-step of 1 second is given initially to stabilize the system for two iterations. A time step of 100 years was taken in all these calculations.

2.6 Initial Conditions
The Table in Appendix 1 gives the full set of 133 masses, their names and the X, Y and Z coordinates. The initial selection criteria for the Masses are shown in Appendix 2 as Fig 1 and Fig 2. The spike at Mass no.132 indicates Andromeda Galaxy. In Fig 3 the mass distribution taken here for the WR stars is shown. The graphs are provided for visual understanding of the initial conditions for these simulations.

3. Mathematical Background

The mathematics of Dynamic Universe Model is published and is available in many open access papers. The following linear tensor equation (1) is the basis for all these calculations.

$$\Phi_{ext}(\alpha) = -\sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\gamma}} \frac{Gm^{\gamma}_{\beta}}{\left|x^{\gamma\beta} - x^{\gamma\alpha}\right|} - \sum_{\substack{\beta=1 \\ \alpha\neq\beta}}^{N^{\delta\gamma}} \frac{Gm^{\delta\gamma}_{\beta}}{\left|x^{\delta\gamma\beta} - x^{\delta\gamma\alpha}\right|} \quad \ldots \textbf{(7)}$$

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

3.1. 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, a inhomogeneous and anisotropic lumpy universe was assumed.

4. Procedure and practical problems:

The quest is simple. We need to find out on which input conditions the path traced by neutron will bend. Disappointingly high different number of varieties of theoretical experiments with different input conditions was conducted. Using the above defined initial values the SITA calculations procedure gave the data outputs. A large amount of output data was produced. Here different input conditions mean different neutron velocities ranging from full light velocity to 1% of velocity of light in different directions. This output data was analyzed using graphs and checked results. Mistakes were corrected. Finally we could get results which were thought probably never possible. All the experiments and outputs were logged. Only final cases are discussed in the next section.
Another hurdle faced is the laptop getting heated up. A new computer has to be purchased with a forced cooling fan. Each experiment lasted for a duration of 2 to 6 hours of rigorous calculations by the new computer. Power failures combined with UPS (uninterrupted power supply unit) failures caused havocs many times and everything needed to be restarted

5. Results

Abbreviations:

In most of the graphs in this document, we will use ***GC*** *for Galaxy center or Milkyway center,* ***NS*** *for near star or a Star moving close to* ***GC****,* ***PM****: point mass or mass, the equivalent mass of the body situated at its gravitational center.* ***Pos*** *means the ecliptic Cartesian xyz coordinate position of the point mass or Neutron, and* ***sx, sy & sz*** *denote positions of xyz axes. Unit of all distances is meters.* ***Vel*** *means the ecliptic xyz velocities associated with the point mass at that instant of time and position. and* ***vx, vy & vz*** *denote velocities of point mass in xyz axes. Unit of all velocities is meters / second. Another word* ***rev*** *is used for revised,* ***bend*** *is for bending,* ***itr*** *is used for iteration number and* ***perp*** *is used for perpendicular. Neutron mass is not changed in all the simulations.*

5.1.1 Positive Bending Results from file 1:

Using the input data as discussed in the previous section, many theoretical experiments were conducted. Finally there is a ray of hope. The first moon is visible. The galaxy Densemass astronomical jets emerging from the Milkyway centre is coming true. There was a perpendicular movement observed in a xy pos movement graph (Iteration vs sx position).

Here in this case 2002 iterations were conducted. Galaxy center mass is 100 times higher. Masses of stars near the Galaxy Center have 10 times less mass.

These observations are stored in the file **"Vvtc EUREKA PERP rev Results 2002xGC Less NS 2 sec Densemass.xls"**

These observations are shown in the Graphs in Appendix 3 in Figure 4 and Figure 5. The details of there for Figure 4 are…. The theoretical path traced by test Neutron is shown in the above. One can see a sharp bend of this particle at the Galaxy center.
Many theoretical experiments with different input conditions were conducted. Using the initial values given in this paper the SITA calculation procedure gave this output. And for Figure 5: This is a x-y velocity plot. The velocity attained by neutron or any other particle that was having some initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF(Universal Gravitation Force) acting on it, caused by all the other 132 dynamically moving gravitating bodies in this simulation. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

5.1.2. Positive Bending Results from file 2:
Here in this case 1000 iterations were conducted as power failures happened twice during this file running almost after 6 hours of starting. Because of these power failures, I changed the number of iterations to 1000 from 2000 and then it ran for 5 hours each twice, The resulting observations are shown in the Graphs in Appendix 4.

Here Galaxy center mass is 100 times higher than normal. Masses of stars near the Galaxy Center have 10 times less mass.

These observations are shown in the Graphs in Appendix 4 n Figure 6 and Figure 7, and stored in the excel file…

Vvtc rev 2000 100xGC Less NS Densemass.xls

The details of there for Figure 6 are…. The theoretical path traced by test Neutron is shown in the above. One can see a sharp bend of this particle after iteration 1653 and place of bending is near Galaxy center.

Here also many different varieties of theoretical experiments with different input conditions were conducted.

And for Figure 7: This is also x-y velocity plot. We can give similar explanation as given to Figure 5.

Here the gravitational pull on the particle 'Neutron' bends its path. Bent is visible in position of X plots only but not in all the plots. Further details can be found in the paper [1].

5.1.3. Positive Bending Results from file 3:

Here in this case 2000 iterations were conducted. Galaxy center mass is unchanged. Masses of stars near the Galaxy Center have 10 times less mass.

These observations are shown in the Graphs in Appendix 5 and stored in the excel file…

Vvtc rev xy BENT 2000 100xGC Less NS Densemass.xls

The graph in Figure 8 is a velocity vx verses iteration plot for this simulation. That is x-y velocity plot. A similar explanation can be given for this graph showing velocity attained by neutron.

Bend is visible in the graph shown in Figure 9. This is an sx vs sy plot for the position of the test particle Neutron. The theoretical path traced by test Neutron is shown in the above. One can see a sharp bend of this particle at the Galaxy center.

5.1.4. Positive Bending Results from file 4:

Here in this case 2002 iterations were conducted. Galaxy center mass is unchanged. Masses of stars near the Galaxy Center have 10 times less mass.

These observations are shown in the Graphs in Appendix 6 and stored in the excel file…

Vvtc rev 2000 Galaxy core Densemass Calc.xls

The Figure 10 shows a graph of the position variation of the test particle. The theoretical path traced by test Neutron is shown in this. This is a sy verses iteration plot. One can see a sharp bend of this particle at the start of iterations.

In this particular case we can see three graphs, (Fig 11, 12 and 13) all are showing either X, Y, or Z direction variation in the speed and velocity of the Neutron , the test particle. Here in this experiment bend is visible at the beginning.

These Figures 11, 12 and 13 are a set of x or y or z velocity graphs showing variation with iterations in these plots. The velocity attained by neutron or any other particle that was having some initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

In this particular case we can see three graphs, (Fig 11,12 and 13) all are showing either X, Y, or Z direction variation in the speed and direction of the Neutron , the test particle.

Again many theoretical experiments with different input conditions was conducted in this case also.

5.1.5. Positive Bending Results from file 5:
Here in this case 2002 iterations were conducted. Galaxy center mass is unchanged. Masses of stars near the Galaxy Center have 10 times less mass.

6. Discussion:

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[14, 15, 2] In the first book, the solution to N-body problem-called Dynamic Universe Model (SITA) is presented; which is singularity-free, inter-body collision free and dynamically stable. The Basic Theory of Dynamic Universe Model published in 2010 [14]. The second book in the series describes the SITA software in EXCEL emphasizing the singularity free portions. This book written in 2011 [15] explains more than 21,000 different equations. 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 is a simplified version and contains explanation for 3000 equations instead of earlier 21000 and this book also was written in 2011[2]. Some of the other papers published by the author are available at refs. [3, 5, 8, 9, 10, 11, 17].

SITA solution can be used in many places like presently unsolved applications like Pioneer anomaly at the Solar system level, Missing mass due to Star circular velocities and Galaxy disk formation at Galaxy level etc. Here we are using it for prediction of blue shifted Galaxies.

6.1 Attached Excel Files

Four files are attached with this paper for further information like initial velocities and directions of Neutrons, and various individual iteration results..

"Vvtc EUREKA PERP rev Results 2002xGC Less NS 2 sec Densemass.xls"

Vvtc rev 2000 100xGC Less NS Densemass.xls

Vvtc rev xy BENT 2000 100xGC Less NS Densemass.xls

Vvtc rev 2000 Galaxy core Densemass Calc.xls

7. Conclusion

Here in this paper we show that when some particles or bodies or neutrons present in some particular positions and having some initial velocities will move first in a direction towards Galaxy center and later they move perpendicularly to the Galactic plane at the Galactic center. The initial velocities of these can range from 0.001 C to 0.999C where C is velocity of light.

Many theoretical experiments were conducted. There are four simulations which gave results were shown in this paper.

In first two simulations Galaxy center mass is 100 times higher. Masses of stars near the Galaxy Center have 10 times less mass.

In the third and fourth simulations Galaxy center mass is unchanged. Masses of stars near the Galaxy Center have 10 times less mass.

There may be many other cases possible.

Hence we may conclude: Dynamic Universe model can be successfully used for explaining the observed high velocities in Astronomical jets coming out perpendicularly from Galaxy canter. Dynamic Universe model is based on hard observed facts and gives many verifiable facts.

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Appendix 1

Initial values Table for calculation of "Explaining near light velocities observed in Astronomical Jets using SITA simulations"

Table 1 describes the simulated initial values used in SITA calculations. In this simulation one (1) densemass of the mass equivalent to Galaxy center, (90) stars with similar masses of stars near Galaxy center, mass equivalents of (23) Globular Cluster groups, (16) Milkyway parts, (1) Andromeda and (1) Triangulum Galaxies at their appropriate distances are there. This gives a total of (133) bodies or point Masses.

The name field gives list of various point masses. Columns heads have names "Mass (kg) , Xecliptic (Metre), Yecliptic (Metre) and Zecliptic (Metre) " , The column "Mass (kg)" contains collected values for Mass in Kg and columns " Xecliptic (Metre), Yecliptic (Metre) and Zecliptic (Metre)" contain x, y and z Cartesian coordinates in meters. These values are from Scientific findings

Here HELIO CENTRIC ECLIPTIC XYZ VALUES of solar system are used, as on 01.01.2009@00.00:00 hrs.

Sl.no	Name	Mass (kg)	Xecliptic (Metre)	Yecliptic (Metre)	Zecliptic (Metre)
1	Test Neutron	1.674927E-27	4.792120E+19	1.674840E+20	1.569913E+20
115	Galaxy center	8.200000E+36	4.792111E+19	1.674833E+20	1.569909E+20
3	Star Galaxy center	3.573305E+30	4.792120E+19	1.674840E+20	1.569913E+20
4	Star Galaxy center	3.928043E+30	4.792122E+19	1.674835E+20	1.569910E+20
5	Star Galaxy center	3.225798E+30	4.792128E+19	1.674835E+20	1.569910E+20
6	Star Galaxy center	4.367416E+30	4.792123E+19	1.674839E+20	1.569912E+20
7	Star Galaxy center	4.239547E+30	4.792125E+19	1.674838E+20	1.569915E+20
8	Star Galaxy center	4.041373E+30	4.792121E+19	1.674836E+20	1.569910E+20
9	Star Galaxy center	3.251570E+30	4.792129E+19	1.674836E+20	1.569911E+20
10	Star Galaxy center	4.242842E+30	4.792120E+19	1.674834E+20	1.569914E+20
11	Star Galaxy center	3.471058E+30	4.792131E+19	1.674834E+20	1.569911E+20
12	Star Galaxy center	4.530610E+30	4.792121E+19	1.674839E+20	1.569915E+20
13	Star Galaxy center	4.096324E+30	4.792126E+19	1.674839E+20	1.569910E+20
14	Star Galaxy center	4.248622E+30	4.792126E+19	1.674839E+20	1.569914E+20
15	Star Galaxy center	4.478567E+30	4.792125E+19	1.674839E+20	1.569913E+20
16	Star Galaxy center	3.473893E+30	4.792123E+19	1.674839E+20	1.569916E+20
17	Star Galaxy center	3.292241E+30	4.792128E+19	1.674834E+20	1.569910E+20
18	Star Galaxy center	3.797745E+30	4.792129E+19	1.674838E+20	1.569915E+20
19	Star Galaxy center	3.478920E+30	4.792123E+19	1.674835E+20	1.569911E+20
20	Star Galaxy center	3.261993E+30	4.792126E+19	1.674838E+20	1.569911E+20
21	Star Galaxy center	4.372917E+30	4.792121E+19	1.674840E+20	1.569915E+20
22	Star Galaxy center	4.443375E+30	4.792118E+19	1.674836E+20	1.569911E+20
23	Star Galaxy center	3.827475E+30	4.792114E+19	1.674838E+20	1.569911E+20
24	Star Galaxy center	4.758333E+30	4.792127E+19	1.674834E+20	1.569915E+20
25	Star Galaxy center	3.311333E+30	4.792132E+19	1.674835E+20	1.569915E+20
26	Star Galaxy center	3.435397E+30	4.792112E+19	1.674836E+20	1.569909E+20
27	Star Galaxy center	3.802297E+30	4.792131E+19	1.674841E+20	1.569911E+20
28	Star Galaxy center	3.772690E+30	4.792117E+19	1.674833E+20	1.569912E+20
29	Star Galaxy center	3.588402E+30	4.792132E+19	1.674840E+20	1.569915E+20
30	Star Galaxy center	3.784375E+30	4.792127E+19	1.674834E+20	1.569915E+20
31	Star Galaxy center	4.546075E+30	4.792132E+19	1.674834E+20	1.569912E+20

Sl.no	Name	Mass (kg)	Xecliptic (Metre)	Yecliptic (Metre)	Zecliptic (Metre)
32	Star Galaxy center	3.838570E+30	4.792113E+19	1.674837E+20	1.569914E+20
33	Star Galaxy center	3.478440E+30	4.792128E+19	1.674834E+20	1.569911E+20
34	Star Galaxy center	4.355758E+30	4.792112E+19	1.674838E+20	1.569916E+20
35	Star Galaxy center	3.838466E+30	4.792118E+19	1.674833E+20	1.569916E+20
36	Star Galaxy center	4.538416E+30	4.792125E+19	1.674840E+20	1.569916E+20
37	Star Galaxy center	3.234885E+30	4.792126E+19	1.674837E+20	1.569916E+20
38	Star Galaxy center	3.812046E+30	4.792119E+19	1.674836E+20	1.569912E+20
39	Star Galaxy center	3.362482E+30	4.792123E+19	1.674834E+20	1.569910E+20
40	Star Galaxy center	4.091251E+30	4.792131E+19	1.674835E+20	1.569915E+20
41	Star Galaxy center	4.498803E+30	4.792127E+19	1.674840E+20	1.569915E+20
42	Star Galaxy center	4.042274E+30	4.792113E+19	1.674840E+20	1.569911E+20
43	Star Galaxy center	4.557487E+30	4.792116E+19	1.674841E+20	1.569911E+20
44	Star Galaxy center	3.926585E+30	4.792117E+19	1.674836E+20	1.569910E+20
45	Star Galaxy center	4.447133E+30	4.792115E+19	1.674837E+20	1.569915E+20
46	Star Galaxy center	4.706819E+30	4.792118E+19	1.674836E+20	1.569915E+20
47	Star Galaxy center	4.413175E+30	4.792125E+19	1.674838E+20	1.569910E+20
48	Star Galaxy center	3.417453E+30	4.792126E+19	1.674839E+20	1.569915E+20
49	Star Galaxy center	3.987100E+30	4.792131E+19	1.674840E+20	1.569909E+20
50	Star Galaxy center	3.315444E+30	4.792117E+19	1.674837E+20	1.569913E+20
51	Star Galaxy center	4.744566E+30	4.792131E+19	1.674840E+20	1.569914E+20
52	Star Galaxy center	4.673767E+30	4.792128E+19	1.674834E+20	1.569916E+20
53	Star Galaxy center	3.839613E+30	4.792124E+19	1.674834E+20	1.569912E+20
54	Star Galaxy center	3.835298E+30	4.792124E+19	1.674838E+20	1.569915E+20
55	Star Galaxy center	4.461728E+30	4.792129E+19	1.674833E+20	1.569911E+20
56	Star Galaxy center	3.661688E+30	4.792129E+19	1.674841E+20	1.569916E+20
57	Star Galaxy center	4.070476E+30	4.792116E+19	1.674839E+20	1.569909E+20
58	Star Galaxy center	4.329355E+30	4.792134E+19	1.674833E+20	1.569915E+20
59	Star Galaxy center	3.858661E+30	4.792125E+19	1.674836E+20	1.569909E+20
60	Star Galaxy center	3.398354E+30	4.792112E+19	1.674835E+20	1.569915E+20
61	Star Galaxy center	4.547555E+30	4.792115E+19	1.674839E+20	1.569910E+20
62	Star Galaxy center	3.245057E+30	4.792123E+19	1.674841E+20	1.569911E+20
63	Star Galaxy center	3.418658E+30	4.792132E+19	1.674835E+20	1.569916E+20
64	Star Galaxy center	3.833571E+30	4.792117E+19	1.674839E+20	1.569911E+20
65	Star Galaxy center	4.234219E+30	4.792113E+19	1.674835E+20	1.569914E+20
66	Star Galaxy center	4.749505E+30	4.792125E+19	1.674836E+20	1.569909E+20
67	Star Galaxy center	4.319780E+30	4.792120E+19	1.674838E+20	1.569912E+20
68	Star Galaxy center	3.863613E+30	4.792122E+19	1.674840E+20	1.569909E+20
69	Star Galaxy center	4.055429E+30	4.792133E+19	1.674838E+20	1.569915E+20
70	Star Galaxy center	4.249795E+30	4.792130E+19	1.674840E+20	1.569910E+20
71	Star Galaxy center	4.094021E+30	4.792130E+19	1.674839E+20	1.569916E+20
72	Star Galaxy center	3.770091E+30	4.792127E+19	1.674838E+20	1.569911E+20
73	Star Galaxy center	4.125388E+30	4.792127E+19	1.674841E+20	1.569911E+20
74	Star Galaxy center	3.993521E+30	4.792116E+19	1.674840E+20	1.569913E+20

Sl.no	Name	Mass (kg)	Xecliptic (Metre)	Yecliptic (Metre)	Zecliptic (Metre)
75	Star Galaxy center	4.456141E+30	4.792111E+19	1.674840E+20	1.569910E+20
76	Star Galaxy center	4.139595E+30	4.792132E+19	1.674837E+20	1.569914E+20
77	Star Galaxy center	3.943964E+30	4.792115E+19	1.674837E+20	1.569911E+20
78	Star Galaxy center	4.442694E+30	4.792128E+19	1.674840E+20	1.569909E+20
79	Star Galaxy center	3.618705E+30	4.792118E+19	1.674836E+20	1.569910E+20
80	Star Galaxy center	3.358775E+30	4.792116E+19	1.674839E+20	1.569915E+20
81	Star Galaxy center	3.335361E+30	4.792115E+19	1.674836E+20	1.569910E+20
82	Star Galaxy center	3.500849E+30	4.792129E+19	1.674841E+20	1.569914E+20
83	Star Galaxy center	3.847760E+30	4.792128E+19	1.674838E+20	1.569916E+20
84	Star Galaxy center	3.694220E+30	4.792119E+19	1.674841E+20	1.569910E+20
85	Star Galaxy center	3.881696E+30	4.792113E+19	1.674835E+20	1.569913E+20
86	Star Galaxy center	3.609717E+30	4.792122E+19	1.674833E+20	1.569914E+20
87	Star Galaxy center	3.415994E+30	4.792122E+19	1.674837E+20	1.569915E+20
88	Star Galaxy center	4.579456E+30	4.792119E+19	1.674839E+20	1.569909E+20
89	Star Galaxy center	4.389382E+30	4.792117E+19	1.674837E+20	1.569916E+20
90	Star Galaxy center	3.635656E+30	4.792117E+19	1.674837E+20	1.569914E+20
91	Star Galaxy center	4.617987E+30	4.792129E+19	1.674840E+20	1.569914E+20
2	Star Galaxy center	4.250738E+30	4.792112E+19	1.674836E+20	1.569910E+20
93	Glob Clus Group	7.433048E+36	-1.794141E+20	-3.617808E+20	-1.422526E+19
94	Glob Clus Group	9.588019E+36	1.487441E+19	2.776645E+19	-7.917057E+19
95	Glob Clus Group	7.055545E+36	6.943749E+19	-4.443522E+18	7.943998E+17
96	Glob Clus Group	6.466306E+36	9.112520E+19	-4.392574E+19	1.890325E+20
97	Glob Clus Group	7.233849E+36	1.053142E+20	2.065035E+19	8.977205E+19
98	Glob Clus Group	6.799233E+36	1.257021E+20	6.155415E+19	3.769931E+19
99	Glob Clus Group	8.072435E+36	1.528796E+20	2.407734E+19	-1.583378E+19
100	Glob Clus Group	9.578268E+36	1.748867E+20	1.357426E+19	-3.139191E+19
101	Glob Clus Group	8.298101E+36	1.856023E+20	5.871257E+19	1.509551E+19
102	Glob Clus Group	1.039039E+37	2.007624E+20	1.023683E+20	7.893477E+19
103	Glob Clus Group	8.995994E+36	2.212317E+20	1.031945E+19	-1.156846E+20
104	Glob Clus Group	8.557199E+36	2.409262E+20	2.387317E+19	8.080952E+18
105	Glob Clus Group	9.817864E+36	2.525209E+20	-1.042138E+19	-1.909681E+18
106	Glob Clus Group	9.861047E+36	2.637235E+20	1.586306E+19	2.362481E+19
107	Glob Clus Group	8.931916E+36	2.802438E+20	4.574036E+18	-5.621662E+18
108	Glob Clus Group	1.009646E+37	2.936153E+20	-2.523789E+19	6.360664E+18
109	Glob Clus Group	1.371269E+37	3.138335E+20	-1.180769E+18	1.466166E+19
110	Glob Clus Group	1.014661E+37	3.353063E+20	-1.680751E+20	-3.478258E+19
111	Glob Clus Group	1.119136E+37	3.723640E+20	1.373623E+19	-1.256474E+20
112	Glob Clus Group	1.022183E+37	4.873153E+20	1.743929E+20	8.660732E+19
113	Glob Clus Group	9.306633E+36	6.491715E+20	1.826149E+18	9.067194E+19
114	Glob Clus Group	9.897265E+36	1.023197E+21	1.531075E+20	4.804418E+20
92	Glob Clus Group	1.205781E+37	-1.169252E+21	-1.042452E+21	9.314970E+19
116	Milkyway part	3.847309E+40	-1.636416E+20	1.478375E+20	-7.974168E+19
117	Milkyway part	4.809137E+40	1.545173E+20	8.225781E+19	1.560490E+20

Sl.no	Name	Mass (kg)	Xecliptic (Metre)	Yecliptic (Metre)	Zecliptic (Metre)
118	Milkyway part	5.770964E+40	-1.146726E+19	4.681656E+19	2.294993E+20
119	Milkyway part	6.732792E+40	-8.865916E+19	-1.061104E+19	2.168414E+20
120	Milkyway part	7.694619E+40	5.624633E+19	-1.612958E+20	-1.606650E+20
121	Milkyway part	8.656446E+40	-1.156500E+20	2.038962E+20	6.682275E+18
122	Milkyway part	9.618274E+40	-3.634226E+19	1.123468E+19	-2.314006E+20
123	Milkyway part	1.058010E+41	-1.722379E+20	-7.678862E+19	1.393945E+20
124	Milkyway part	1.058010E+41	-2.050746E+19	-2.195767E+20	7.974168E+19
125	Milkyway part	9.618274E+40	-1.583735E+20	7.456390E+19	-1.560490E+20
126	Milkyway part	8.656446E+40	-3.064451E+19	-3.720487E+19	-2.294993E+20
127	Milkyway part	7.694619E+40	6.156003E+19	-6.467923E+19	-2.168414E+20
128	Milkyway part	6.732792E+40	9.556133E+19	1.415910E+20	1.606650E+20
129	Milkyway part	5.770964E+40	2.325639E+20	-2.937039E+19	-6.682275E+18
130	Milkyway part	4.809137E+40	3.075009E+19	2.239219E+19	2.314006E+20
131	Milkyway part	3.847309E+40	4.155813E+19	1.839438E+20	-1.393945E+20
132	Andromeda	1.412900E+42	1.742665E+22	1.504870E+22	6.792536E+21
133	Triangulum Galaxy	1.412900E+41	1.285457E+20	1.930831E+22	-1.820289E+22

Appendix 2

Initial mass selection criteria for WR stars were presented in Fig1, Fig2 and Fig3.

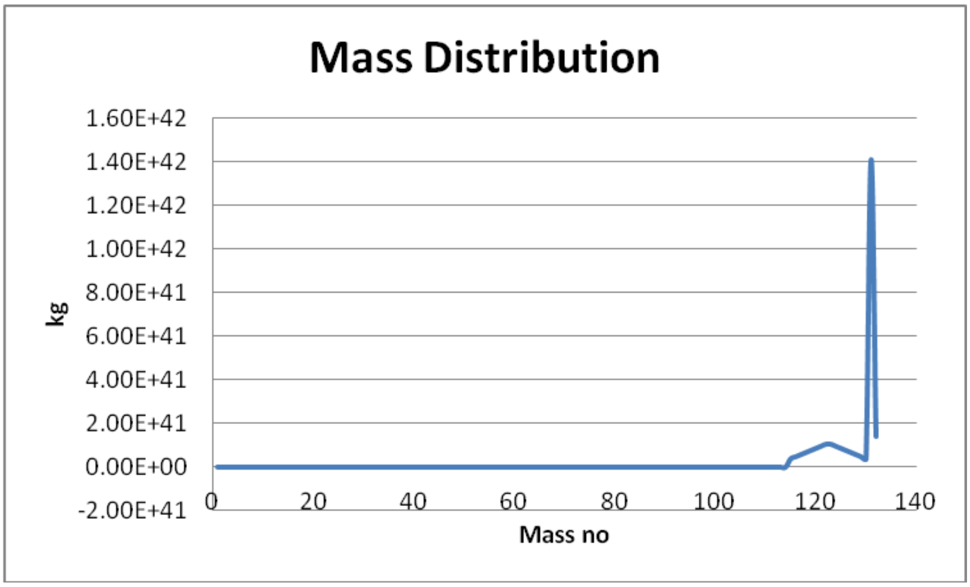

Fig 1. All the masses (Units kg) in this simulation are shown here. The spike is Andromeda Galaxy

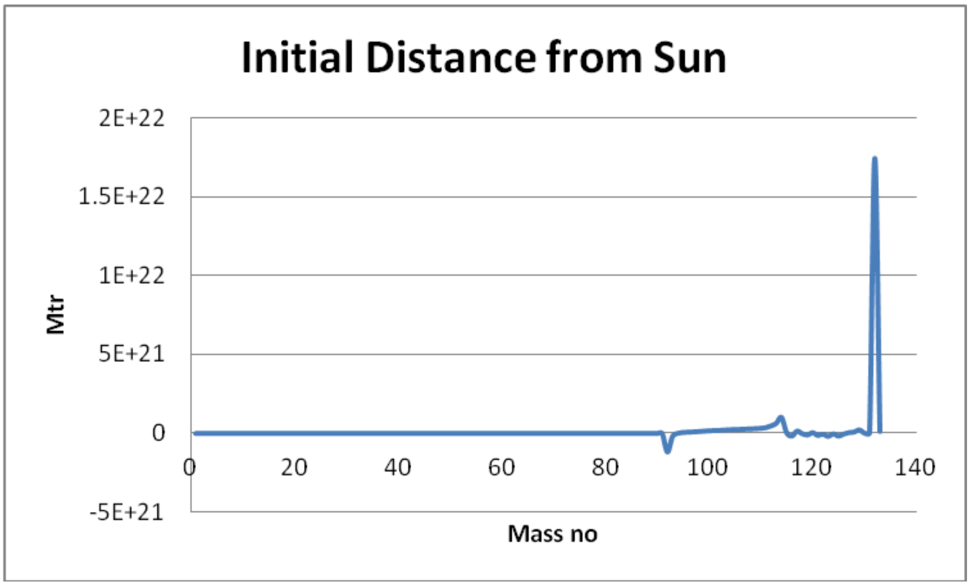

Fig.2. The ecliptic X coordinate distancs of the mass from Sun in meters is represented in is shown here.

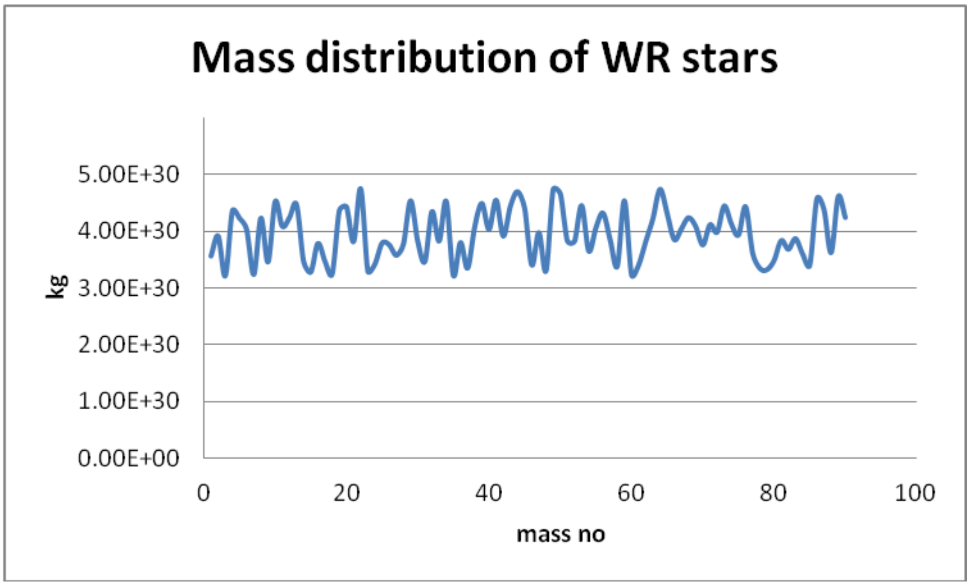

Fig 3. Shows the masses of Wolf-Rayet stars (WR stars or Galaxy Center Stars) used in this simulation.

Appendix 3

Graphs from 'all point masses are Clusters (approximately 10^9 stars) ' simulation

These observations are stored in the file
"Vvtc EUREKA PERP rev Results 2002xGC Less NS 2 sec Densemass.xls"
or
Vvtc rev Results 2002xGC Less NS 2 sec Densemass.xls

Results are same
Note:
Power failures happened twice during this file running almost after 6 hours of starting.. Because of these power failures I reduced no of iterations in the file
"Vvtc rev Results 100xGC Less NS 2 sec Densemass.xls"
Changed the number of iterations to 1000 from 2000 and then it ran for 5 hours each twice

The observation is shown in the Graph below

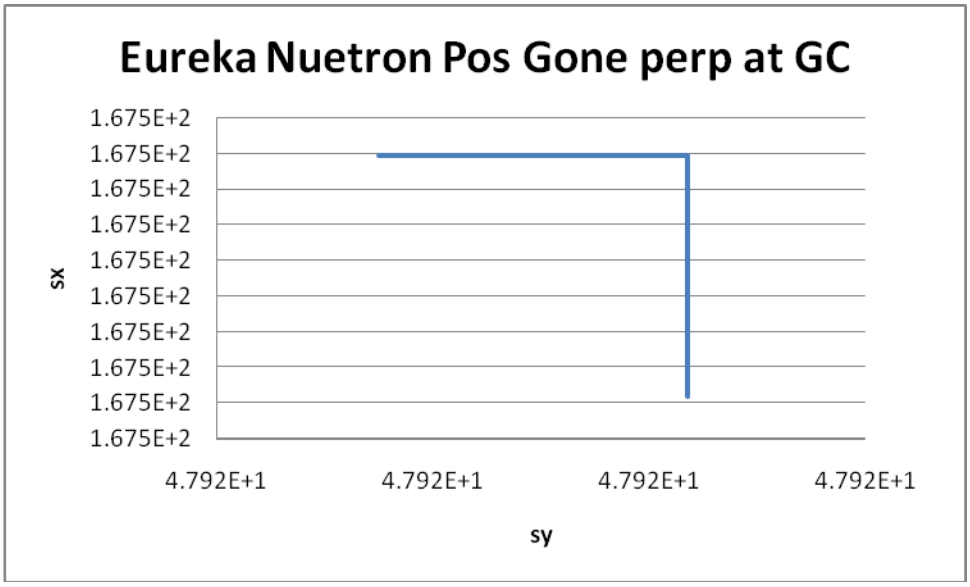

Figure 4. The theoritical path traced by test Neutron is shown in the above. One can see a sharp bend of this particle at the Galaxy ceter.
Disappointingly high different number of varieties of theoretical experiments with different input conditions was conducted. Using the initial values given in this paper the SITA calculation procedure gave this output.

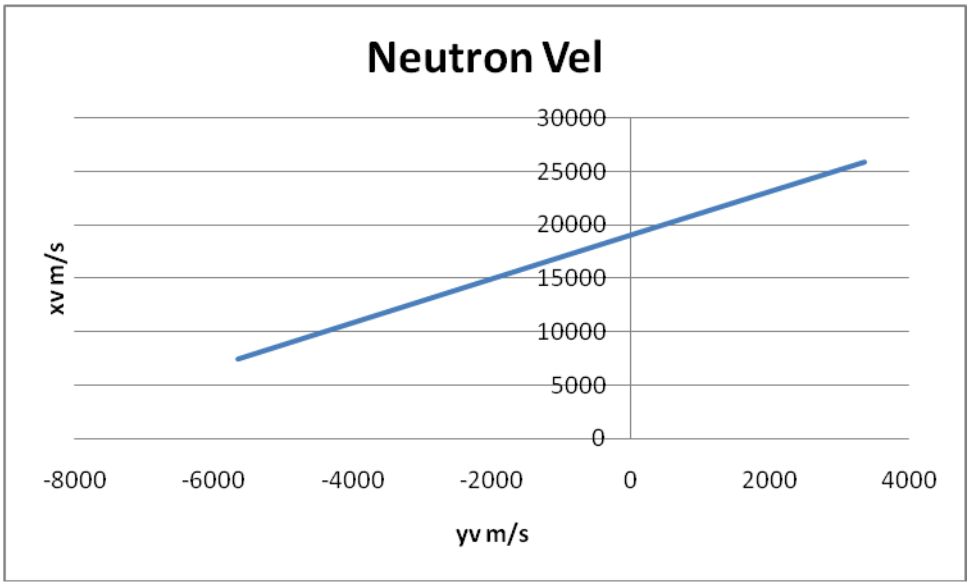

Figure 5: This is a x-y velocity plot. The velocity attained by neutron or any other particle that was having some initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF(Universal Gravitation Force) acting on it, caused by all the other 132 dynamically moving gravitating bodies in this simulation. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

Appendix 4

Positive Bending Results from the file:

<u>Vvtc rev 2000 100xGC Less NS Densemass</u>.xls

Neutron Bent is visible in position of XY plots only. But not in all the graphs

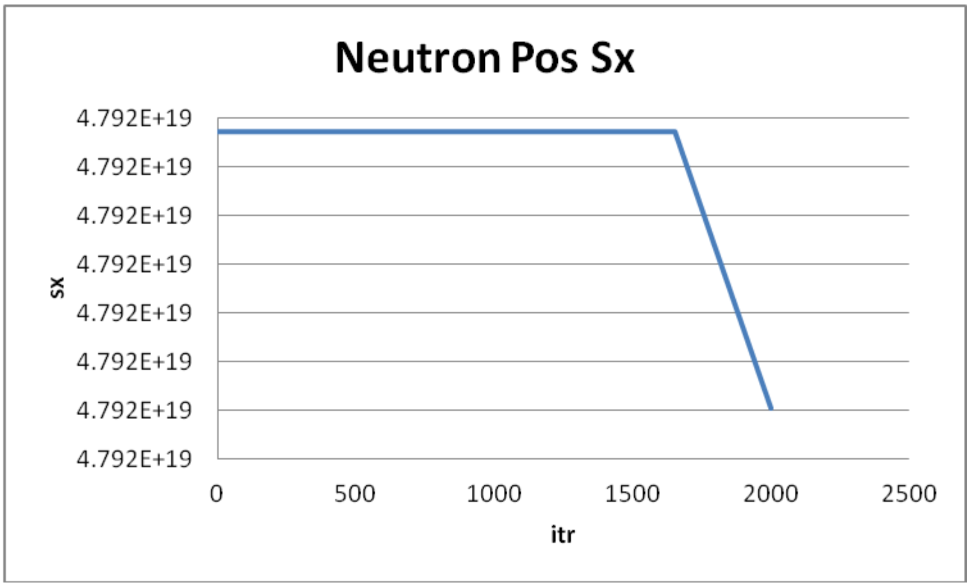

Figure 6. Here neutron position sx is plotted againest the no. of iteration in this simuation. The theoritical path traced by test particle Neutron is shown here. One can see a sharp bend in the path traced by this particle after iteration 1653. This place of bending is near Galaxy Center.

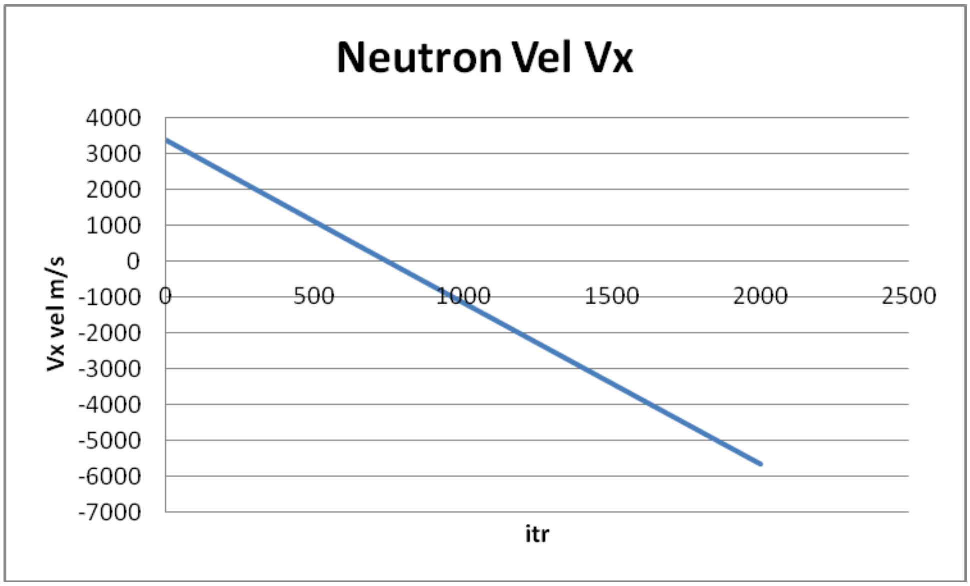

Figure 7: This is a x-y velocity plot. The velocity attained by neutron or any other particle that was having some initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF(Universal Gravitation Force) acting on it, caused by all the

other 132 dynamically moving gravitating bodies in this simulation. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

Appendix 5
Positive Bending Results from the file:
Vvtc rev 2000 Galaxy core Less Densemass.xls

This also produced similar graphs

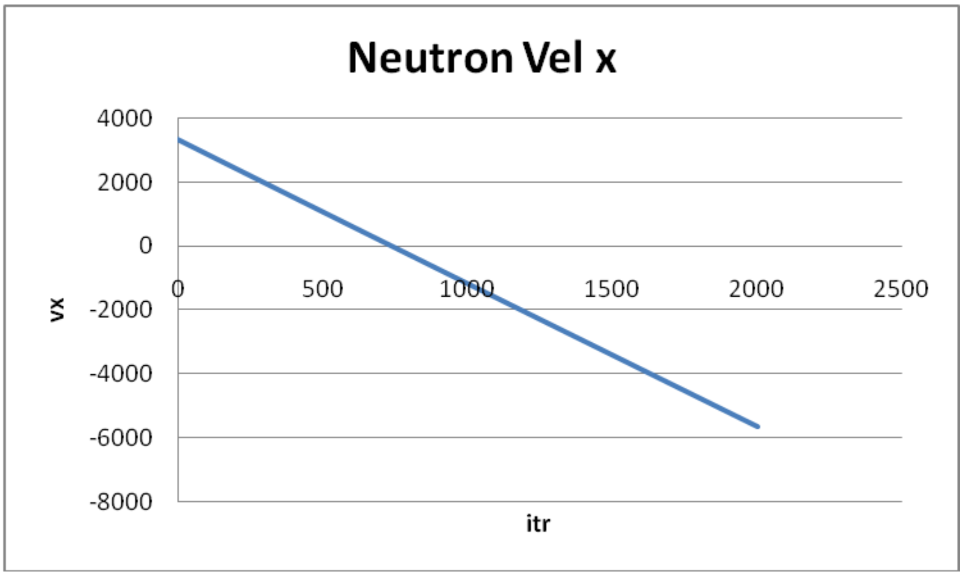

Figure 8: This is a velocity vx verses iteration plot for this simulation. That is x-y velocity plot. The velocity attained by neutron or any other particle that was having some initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF(Universal Gravitation Force) acting on it, caused by all the other 132 dynamically moving gravitating bodies in this simulation. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

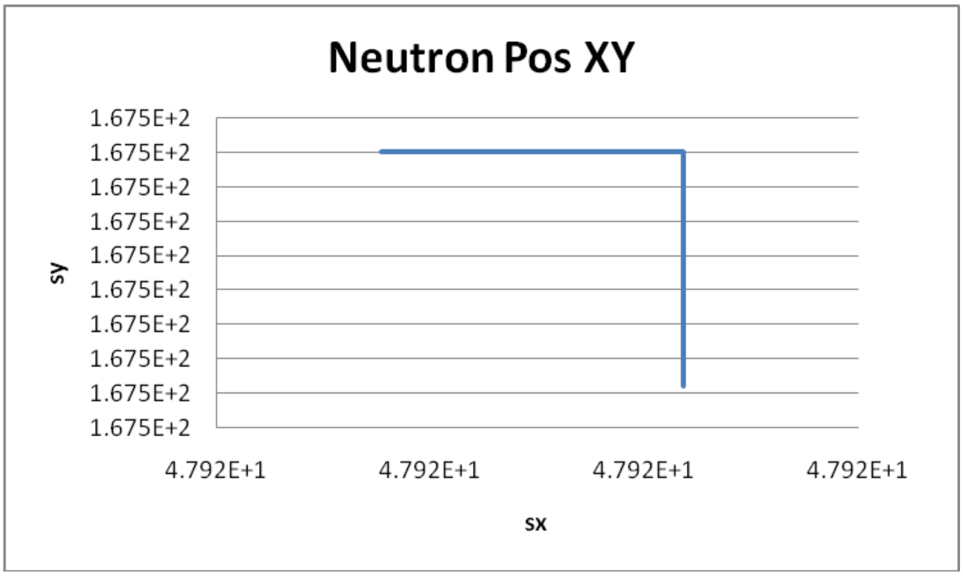

Figure 9. This is an sx vs sy plot for the position of the test particle Neutron. The theoretical path traced by test Neutron is shown in the above. One can see a sharp bend of this particle at the Galaxy center.

Appendix 6

<u>**Vvtc rev 2000 Galaxy core Densemass Calc.xls**</u>

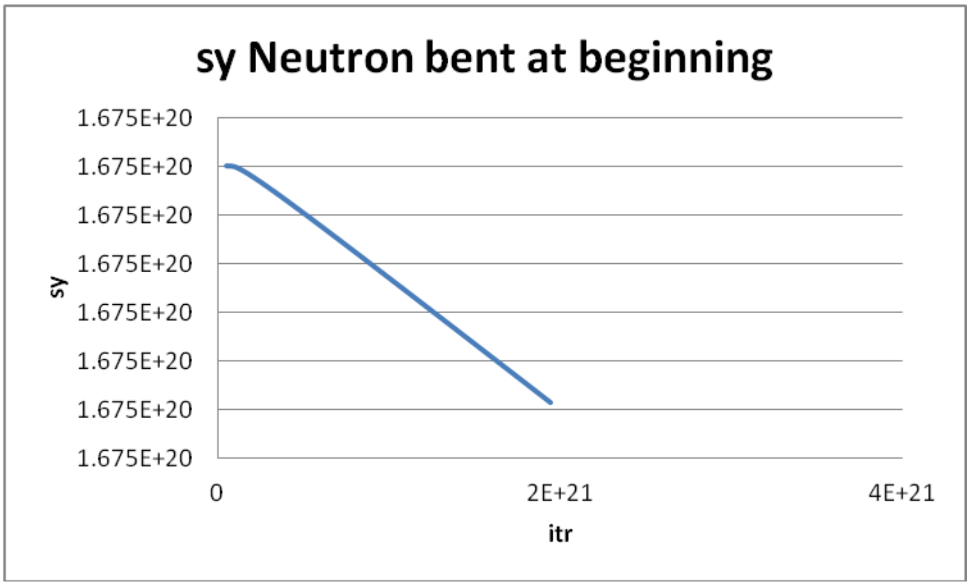

Figure 10. This shows a graph of the position variation of the test particle. The theoretical path traced by test Neutron is shown in this. This is a sy verses iteration plot. One can see a sharp bend of this particle at the start of iterations.

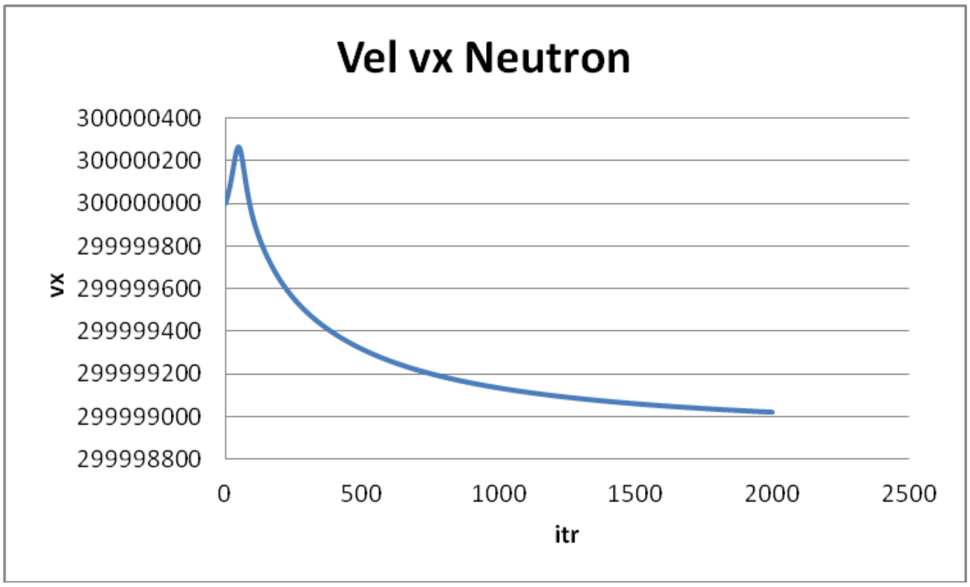

Figure 11: This is a x velocity varying with iterations plot. The velocity attained by neutron or any other particle that was having some initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

In this particular case we can see three graphs, (Fig 11,12 and 13) all are showing either X, Y, or Z direction variation in the speed and direction of the Neutron , the test particle.

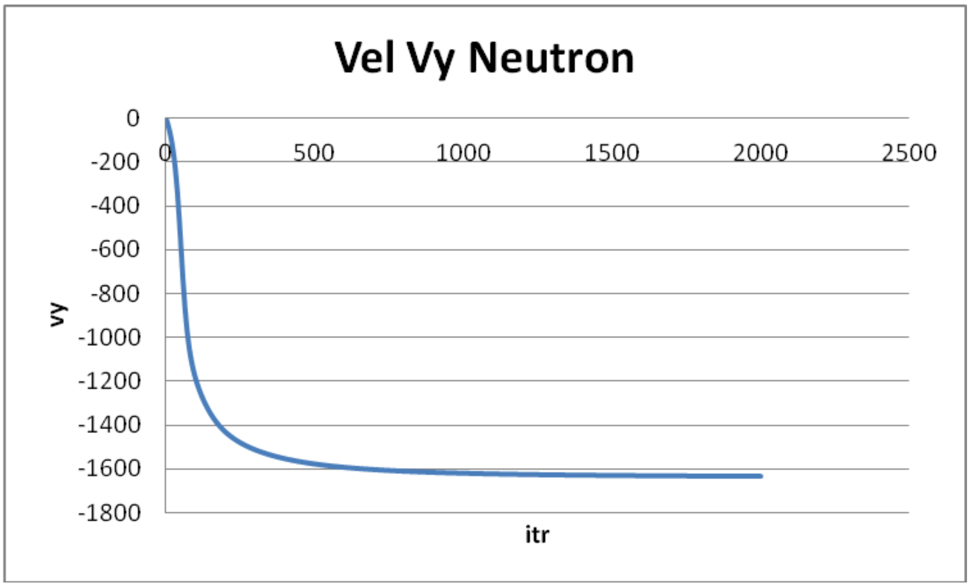

Figure 12: In this the y velocity varying with iterations are plotted. The velocity attained by neutron or any other particle that was having some near light initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

In this particular case we can see three graphs, (Fig 11, 12 and 13) all are showing either X, Y, or Z direction variation in the speed and direction of the Neutron , the test particle.

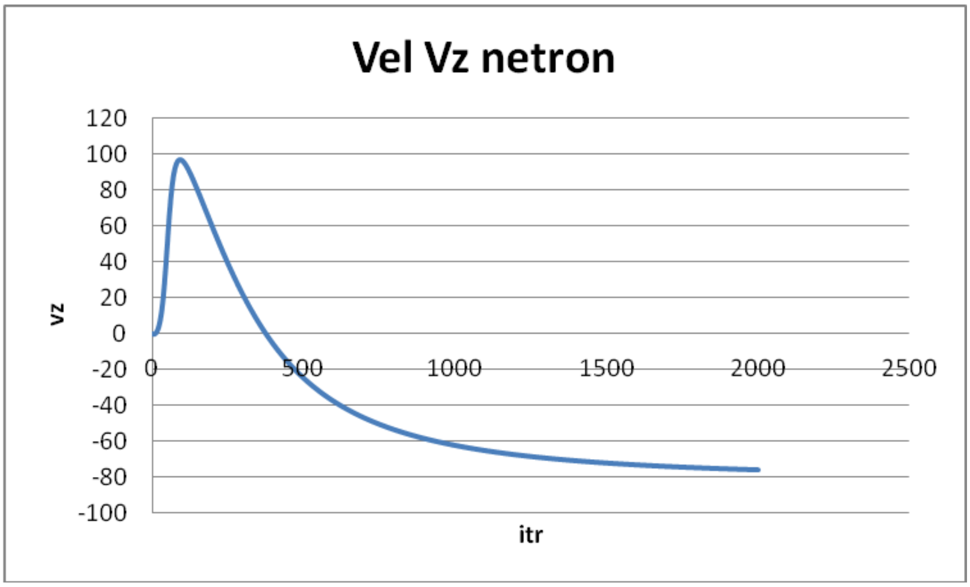

Figure 13: This is a z velocity varying with iterations plot. The velocity attained by neutron or any other particle that was having some near light initial velocity and direction had slow change in velocity and direction from iteration to ieration due to UGF. This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

In this particular case we can see three graphs, (Fig 11, 12 and 13) all are showing either X, Y, or Z direction variation in the speed and direction of the Neutron , the test particle.

Appendix 6

<u>Vvtc rev xy BENT 2000 100xGC Less NS Densemass.xls</u>

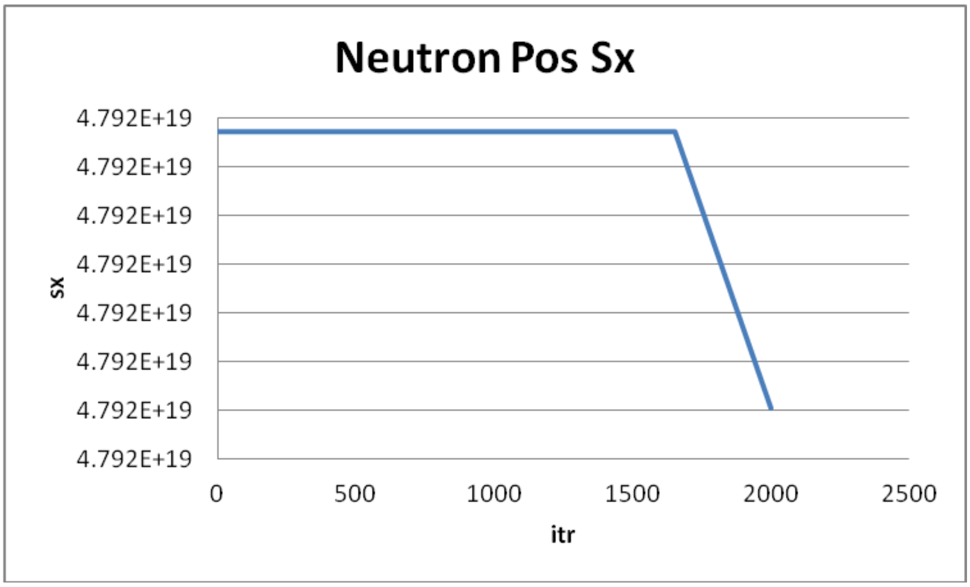

Figure 14. The theoritical path traced by test Neutron is shown in the above. One can see a sharp bend of this particle at the Galaxy ceter.

Disappointingly high different number of varieties of theoretical experiments with different input conditions was conducted. Using the initial values given in this paper the SITA calculation procedure gave this output.

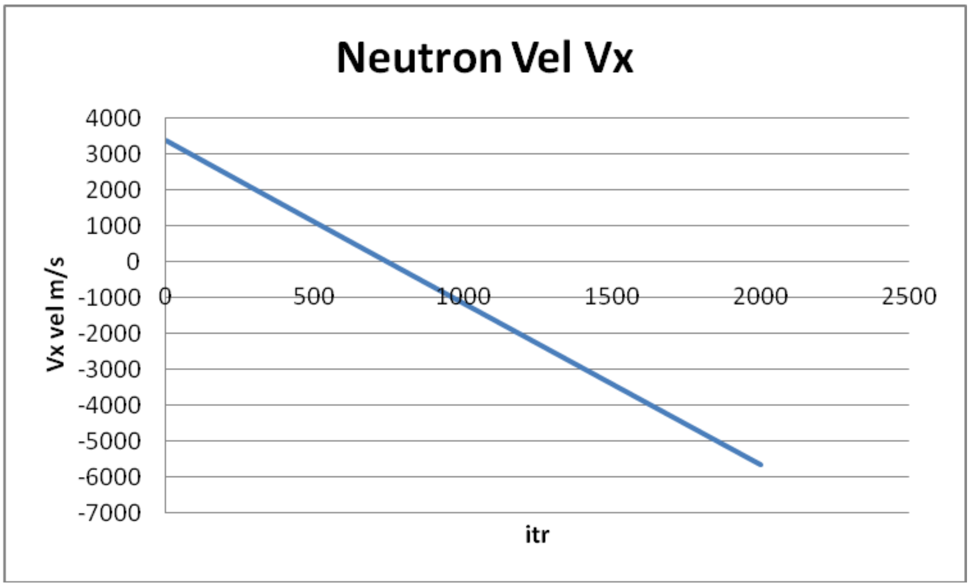

Figure 15: This is a x-y velocity plot. The velocity attained by neutron or any other particle that was having some initial velocity and direction had slow change in velocity and direction from iteration to iteration due to UGF(Universal Gravitation Force). This way any particle will attain greater speed as its speed and direction continuously vary from time to time.

…-xXx-...