The Young Age Of Globular Clusters

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Introduction

Globular clusters are considered by evolutionists to be the oldest structures in the universe.[1-4] According to a recent astronomy magazine article they are over ten billion years old. [4] When neutron stars are formed they are ejected [kicked] out at hundreds of kilometres per second. The time to escape from the centre to the outer edge is only a few thousand years. If they form only once every million years per cluster there should only be a few in every cluster. Many clusters have hundreds or thousands which indicates youth. This lines up with them being created only a few thousand years ago. A recent article admits this is a problem that evolutionists need to resolve:

"There is mounting evidence that as many as 1000 neutron stars (NSs) may be present in some of the richest globular clusters in the Galaxy, which perhaps amounts to more than 10%–20% of the NSs ever formed in each cluster. Such a large NS retention fraction is seemingly at odds with recent estimates of the characteristic "kick" speeds of single radio pulsars in the Galaxy, ranging from roughly 5 to 10 times the central escape speeds of the most massive globular clusters. This retention problem is a long-standing mystery."[5]

If we know the radius of the globular cluster and how fast the stars are shot out we can work out escape times. We find the ratio of the stars velocity to the speed of light and multiply the inverse by the radius of the cluster:

$$t = \frac{c}{v} r \qquad \textbf{(1)}$$

T= escape time in years
C= Velocity of light, kilometres per second.
V= Velocity of neutron star, kilometres per second.
R = Radius of the globular cluster in light years

In the table below we can see a summary for 148 globular clusters.[6] Even at a slow speed of only 50 kilometres per second, the maximum age is only 5.5 million years. Using a very modest speed of 200 kilometres per second would give an average age of only 200 thousand years. The clusters a supposed to be billions of years old!

Table 1. Escape times summary from 148 Globular Clusters

Escape Time Years	50 Km/sec	100 Km/sec	200 Km/sec	300 Km/sec	450 Km/sec
Minimum Time	107,580	53,790	26,895	17,930	11,953
Minimum Time	5,570,688	2,785,344	1,392,672	928,448	618,965
Average Time	838,820	419,410	209,705	139,803	93,202

The Messier Clusters

The Messier catalogue contains 29 globular clusters.[7] Their physical sizes were taken from online catalogues.[8-36]

Table 2. Messier Globular Clusters, Escape Times

Globular Clusters	Max Age	Minimum Age	Clusters Radius	Evolutionist Age
Name	Years	Years	Light Years	Billion Years
Messier 2	261,900	58,200	87	13,000
Messier 3	270,000	60,000	90	8,000
Messier 4	105,000	23,333	35	12,200
Messier 5	240,000	53,333	80	13,000
Messier 9	135,000	30,000	45	12,000
Messier 10	124,800	27,733	41.6	11,390
Messier 12	111,600	24,800	37.2	12,670
Messier 13	252,000	56,000	84	11,650
Messier 14	150,000	33,333	50	14,200
Messier 15	264,000	58,667	88	12,000
Messier 19	210,000	46,667	70	11,900
Messier 22	150,000	33,333	50	12,000
Messier 28	90,000	20,000	30	12,000
Messier 30	279,000	62,000	93	12,930
Messier 53	660,000	146,667	220	12,670
Messier 54	459,000	102,000	153	13,000
Messier 55	144,000	32,000	48	12,300
Messier 56	126,000	28,000	42	13,700
Messier 62	147,000	32,667	49	11,780
Messier 68	159,000	35,333	53	11,200
Messier 69	126,000	28,000	42	13,060
Messier 70	102,000	22,667	34	12,800
Messier 71	39,000	8,667	13	9,500
Messier 72	126,000	28,000	42	9,500
Messier 75	201,000	44,667	67	9,500
Messier 79	354,000	78,667	118	11,700
Messier 80	144,000	32,000	48	12,540
Messier 92	357,000	79,333	119	14,200
Messier 107	118,500	26,333	39.5	13,950

The fastest escape times assume a speed of 450 kilometres per second and the slowest, 100 kilometres per second. Even using the slowest speed, the maximum age is only 660 thousand years. According to current estimates [8-36] they are between eight and sixteen billion years old.

Table 3. Summary of escape times from 29 Messier globular clusters.

Escape Time	Years
Minimum	8,667
Maximum	660,000
Average	104,653

Neutron Star Kick Speeds

Examining the current literature, [37-54] neutron stars have more than enough speed to exit a globular cluster in a few thousand years. The escape velocity [Table 10] from the globular clusters gravitational pull is on average only 20 kilometres per second. Many kick speeds are ten or twenty times that value.

Table 4. Neutron Star Kick Speeds

Kick Speed Km/Second	Magazine Reference	Kick Speed Km/Second	Magazine Reference
50-750	39	260	37
90	47	290	37
100	45, 48, 49	300	42, 45
100-200	42	330	46
100-300	39	400	39, 52
100-500	39	450	40, 43, 45, 46
110-800	39	480-2370	39
200-500	41	500	41, 42, 44, 47, 48, 49, 50, 51, 53
175	46	700	46, 51
200	38, 44, 45, 50, 51, 52, 53	1000	38, 41, 44, 46, 47, 48, 49, 50, 51, 52, 53
225	37	1600	46

The average kick speed listed in popular astronomy magazine articles is over 500 kilometres per second.

Table 5. Statistical Summary of Table 4

Kick Speed	Km/Second
Average	519
Maximum	2370
Minimum	50

The Astrophysical Journal [54] lists the kick speeds of 49 neutron stars. The average speed is 384 kilometres per second. The minimum speed is 162 kilometres per second. That is eight times the average escape velocity from a normal globular cluster.

Table 6. Neutron Star Kick Speeds [54]

Pulsar Number	Kick Speed Km/Sec	Error Margin Km/Sec	Pulsar Number	Kick Speed Km/Sec	Error Margin Km/Sec
136+57	340	137	1508+55	755	35
329+54	219	80	1556+44	196	94
355+54	210	87	1600+49	489	370
450+55	255	72	1642+3	196	89
458+46	191	111	1706+16	186	137
525+21	286	129	1749+28	162	117
531+21	228	98	1818+4	333	98
540+23	348	193	1822+9	187	112
611+22	212	88	1842+14	550	275
626+24	278	149	1911+4	254	123
628+28	351	121	1917+0	244	102
630+17	212	89	1929+10	167	85
643+80	283	63	1933+16	996	324
656+14	331	167	1946+35	435	224
736+40	377	236	1953+50	1546	245
740+28	276	108	2020+28	192	98
818+13	423	155	2021+51	182	78
823+26	220	32	2045+16	393	73
833+45	226	145	2053+36	242	120
834+6	190	39	2110+27	445	93
906+17	191	57	2154+40	1043	200
943+10	374	89	2217+47	417	193
1133+16	463	88	2224+65	1661	276
1426+66	354	83	2351+61	411	194
1449+64	337	87			

Table 7.Statistical Summary of Table 6

Kick Speed	Km/Second
Average	384
Maximum	1,661
Minimum	162

The Zou Catalogue of Neutron Star Kick Speeds

This catalogue was compiled in 2005 by scientists from China and the CSIRO in Australia [55]. It lists the velocities of 74 neutron stars [56], giving the average speed as over 1,000 kilometres per second. Using this as an average our calculations would make the average ages of globular clusters in the Milky Way galaxy only tens of thousands of years old.

Table 8. Zou Catalogue of Neutron Star Kick Speeds [56]

Velocity	Km/Second
Maximum	11,000
Minimum	10
Average	1,094

It lists in a second table the velocities of 16 neutron stars [57], giving the average speed as over 1,000 kilometres per second. The velocity calculations are supposed to be much more accurate that the first table. Using this as an average our calculations would again make the average ages of globular clusters in the Milky Way galaxy only tens of thousands of years old.

Table 9. Zou Catalogue of Neutron Star Kick Speeds [57]

Radial Velocities	Velocity A Km/Sec	Velocity B Km/Sec
Average	355	1,039
Maximum	2,200	7,300
Minimum	0	36

The Toscano Catalogue of Neutron Star Kick Speeds

This catalogue was compiled in 1999 by scientists from USA and the CSIRO in Australia [58]. It lists the velocities of 23 neutron stars [59], giving the average speed as over 80 kilometres per second. Eight of these are in binary systems. [60] Using this as an average our calculations would make the average ages of globular clusters in the Milky Way galaxy only tens of thousands of years old. Even binary neutron stars have very short escape times.

Table 10. Toscano Catalogue of Neutron Star Kick Speeds [59, 60]

Velocity Km/Sec	All Pulsars	Binary Pulsars
Average	85	87
Maximum	284	183
Minimum	14	27

His article explains that pulsar speeds have an average velocity of 83 kilometres per second. “Most of the ordinary pulsars have velocities up to 500 km/sec, with a small number of pulsars with velocities as high as 1000 km/sec: The vast majority of MSPs, however, have velocities less than 130 km/sec and average just 85 km/sec [+-13 km/sec.]” [61]

The Hobbs Catalogue of Neutron Star Kick Speeds

This catalogue was compiled in 2005 by scientists from England and the CSIRO in Australia [62]. It lists the velocities of 233 neutron stars [63], giving the average speed as over 1,000 kilometres per second. Using this as an average our calculations would make the average ages of globular clusters in the Milky Way galaxy only tens of thousands of years old.

Table 11. Hobbs Catalogue of Neutron Star Kick Speeds [56]

Velocity Summary	Velocity A Km/Sec	Velocity B Km/Sec
Average	206	70
Maximum	1,624	891
Minimum	12	-215

The second table in Hobbs article [64] gives the assumed evolutionary age in base 10 logarithms as well as the velocity. If we use the following formula we can work out how far the neutron star has travelled since it was born.

$$d = 10^{x} \frac{c}{v}$$

Where d = light years travelled, x = logarithmic age, c= velocity of light and v = current velocity. Since the majority of globular clusters only have a radius of 100 light years, 99.99% of neutron stars should have exited their parent cluster millions of years ago. The fact that so many neutron stars are still inside their parent cluster shows that they formed only a few thousand years ago.

Table 12. Distance Travelled

Velocity Summary	Velocity Km/Sec	Age Years	Light Years Travelled
Average	102	1,690,865,827	160,424
Maximum	729	32,359,365,693	8,629,164
Minimum	1	1,230	0

Another table [65] has the velocity determined by parallax measurement. These speeds give very young ages also.

Table 13. Velocity determined by parallax

Velocity Summary	Velocity A Km/Sec
Average	174
Maximum	641
Minimum	27

Another table [66] in Hobbs article gives the median velocity for two different measurement techniques as 79 to 100 kilometres/second for group A and 139 to 187 kilometres/second for group B. I calculated the statistical values [67] for neutron stars associated with supernova remnants. The values in kilometres per second are: Average 213, Maximum 740 and Minimum 59.

The final table [68] in his article gives the velocities of 39 neutron stars. Thirty one of these are binary systems and eight are solo. If we add age data from table 2 in his article to this table we can work out how far the binary systems have travelled since they were born. Since the majority of globular clusters only have a radius of 100 light years, 99.99% of neutron stars should have exited their parent cluster millions of years ago. The fact that so many neutron stars are still inside their parent cluster shows that they formed only a few thousand years ago.

Table 14. Binary Pulsars Distance Travelled

Velocity Summary	Velocity Km/Sec	Age Million Years	Light Years Travelled
Average	82	6,275	1,354,399
Maximum	359	22,387	4,753,338
Minimum	1	10,934	102

The Wang Catalogue of Binary Neutron Star Kick Speeds

This catalogue [39] was compiled in 2006 by scientist from Beijing and New York. Evolutionists claim that if the neutron stars were in a binary system it would make the escape time much longer. As far as neutron stars being in a binary system the average speed is 450 kilometres per second! There are 29 globular clusters listed in the Messier catalogue. Using the average speed, the maximum age is only 146 thousand years. According to current estimates [8-36] they are between eight and sixteen billion years old.

Table 15. Binary Pulsars Velocities

Velocity Summary	Kilometres Second
Average	452
Maximum	1,108
Minimum	15

The Webbink Catalogue

This catalogue was compiled in 1985 by the International Astronomical Union [69]. The maximum escape velocity from any of the 167 globular clusters is only 78 kilometres per second. Even using the slowest escape speed [22 kilometres per second] the maximum age of the oldest would be less than one million years. Since neutron stars travel much faster than the lowest escape speeds we can be sure they are less than one hundred thousand year old.

Table 16. Globular Cluster Escape Times And Velocities

Statistics Summary	Escape Time 50 Km/sec	Escape Time 100 Km/sec	Escape Time 200 Km/sec	Escape Time 300 Km/sec	Escape Velocity Km/sec
Average	838,820	419,410	209,705	139,803	22
Maximum	5,570,688	2,785,344	1,392,672	928,448	78
Minimum	107,580	53,790	26,895	17,930	1

The Globular Cluster 47 Tucanae

The globular cluster 47 Tucanae [NGC 104] contains at least 300 neutron stars. [70, 71] It is 16,700 light years from Earth, has a radius of 60 light years and contains over 700,000 stars. [72] According to a recent astronomy article it is 13 billion years old. [73, 74] Below we can see some tables calculated from data [70, 71] in magazine articles for neutron stars.

Table 17. Neutron Star Escape Times

Statistical Summary	Escape Time 50 Km/Sec	Escape Time 100 Km/Sec	Escape Time 200 Km/Sec	Escape Time 300 Km/Sec	Escape Time 450 Km/Sec
Average	96,456	48,228	24,114	16,076	10,717
Maximum	323,566	161,783	80,892	53,928	35,952
Minimum	486	243	121	81	54

Table 18. Neutron Stars Maximum Ages

Statistical Summary	50 Km/Sec Max Age	100 Km/Sec Max Age	200 Km/Sec Max Age	300 Km/Sec Max Age	450 Km/Sec Max Age
Average	263,544	131,772	65,886	43,924	29,283
Maximum	359,514	179,757	89,879	59,919	39,946
Minimum	36,434	18,217	9,108	6,072	4,048

The escape time is the time to travel from its current location to outside the clusters radius. The maximum age is how long it would have taken to travel from the centre of the cluster to the stars current location. The maximum age for the oldest is just 360 thousand years. The evolutionist age of the cluster is 36,111 times the maximum escape age. If they are produced at the rate of one per million years per cluster then there should be only one or two instead of 300. When a new one is produced, all the previous ones should have escaped.

The Angular Diameter Formula

If we use the angular diameter formula [75] we find:

$$\delta = \left(\frac{206265d}{D} \right) \qquad \textbf{(2)}$$

Where:
□□□ Angular separation (arc seconds)
d = Neutron stars Distance from cluster’s core (Light Years)
D = Distance from earth (Light Years)

Since the distances are listed in arc minutes we change the formula:

$$d = \left(\frac{\delta \times D \times 60}{206265} \right) \qquad \textbf{(3)}$$

We use the next formula to get them maximum age

$$a = \frac{c}{v} d \qquad \textbf{(4)}$$

a = Maximum age
d = Neutron stars Distance from cluster’s core (Light Years)
r= Clusters radius (Light Years)

$$t = \frac{c}{v} \times \left(\frac{\delta \times D \times 60}{206265} \right) \qquad \textbf{(5)}$$

For neutron stars d light years from the centre, the time [T] since escaping is thus

$$T = \frac{c}{v}(r - d) \qquad \textbf{(6)}$$

The Globular Cluster Omega Centauri

The globular cluster Omega Centauri is 15,800 light years from Earth, has a radius of 86 light years and has over four million stars. [76] It has at least forty neutron stars [77]. According to recent astronomy articles it is 11.5 billion years old. [73, 74] According to the neutron star retention rate, the maximum age of the cluster is just half a million years. That is 23,000 times younger than the evolutionist Big Ban model!

Table 19. Omega Centauri. Maximum Ages

Statistical Summary	Max Age 50 Km/Sec	Max Age 100 Km/Sec	Max Age 200 Km/Sec	Max Age 300 Km/Sec	Max Age 450 Km/Sec
Average	188,763	94,382	47,191	31,461	20,974
Maximum	505,471	252,736	126,368	84,245	56,163
Minimum	26,528	13,264	6,632	4,421	2,948

Table 20. Omega Centauri. Escape Times

Statistical Summary	Escape Time 50 Km/Sec	Escape Time 100 Km/Sec	Escape Time 200 Km/Sec	Escape Time 300 Km/Sec	Escape Time 450 Km/Sec
Average	327,237	163,618	81,809	54,539	36,360
Maximum	489,472	244,736	122,368	81,579	54,386
Minimum	10,529	5,264	2,632	1,755	1,170

Darryl Haggard [78] has compiled a list of 180 neutron stars in the Omega Centauri cluster. According to this data the maximum age is less than 300 thousand years old. The maximum escape time for those closest to the core is 500 thousand years.

Table 21. Omega Centauri. Maximum Ages

Statistical Summary	Max Age 50 Km/sec	Max Age 100 Km/sec	Max Age 200 Km/sec	Max Age 300 Km/sec	Max Age 450 Km/sec
Average	134,367	67,183	33,592	22,394	14,930
Maximum	280,803	140,402	70,201	46,801	31,200
Minimum	8,685	4,342	2,171	1,447	965

Table 22. Omega Centauri. Escape Times

Statistical Summary	Escape Time 50 Km/sec	Escape Time 100 Km/sec	Escape Time 200 Km/sec	Escape Time 300 Km/sec	Escape Time 450 Km/sec
Average	381,633	190,817	95,408	63,606	42,404
Maximum	507,315	253,658	126,829	84,553	56,368
Minimum	235,197	117,598	58,799	39,199	26,133

The Harris Online Catalogue

Harris has compiled a list of 147 Globular clusters [79]. One hundred and four of these are NGC objects. If we combine data from the online NGC catalogue [80] we can find the radius of these clusters. Even using very slow kick speeds the maximum age is less than one million years. Recent astronomy magazine articles [73, 74] which lists the assumed evolutionist ages of 96 globular clusters, has the ages of 72 of those listed in the Harris catalogue. The average age is 12.26 billion years. The maximum is 13.95 and the minimum is just 9.98 billion years old.

Table 23. Harris (72 NGC Objects)

Statistical Summary	Escape Time 50 Km/Sec	Escape Time 100 Km/Sec	Escape Time 200 Km/Sec	Escape Time 300 Km/Sec	Escape Time 450 Km/Sec
Average	257,548	128,774	64,387	42,925	28,616
Maximum	963,448	481,724	240,862	160,575	107,050
Minimum	15,078	7,539	3,769	2,513	1,675

What is the ratio of the evolutionist ages versus the neutron star escape times? In the table below we can see that with an escape speed of 50 kilometres per second the maximum age is over 160 thousand times younger than the evolutionist one. With an escape speed of 450 kilometres per second the maximum age is over 1.5 million times younger than the evolutionist one.

Table 24. Age Ratio Summary

Age Ratios	Evolutionist Age Billion Years	Age Ratio 50 Km/Sec	Age Ratio 450 Km/Sec
Average	**12.26**	**57,906**	**521,157**
Maximum	**13.95**	**167,312**	**1,505,811**
Minimum	**9.98**	**12,767**	**114,900**

The Astrophysical Journal [74] has an article which has the ages of 55 globular clusters. The difference between the evolutionist age and neutron star retention age is enormous.

The Paulo Freire Catalogue

Paulo Freire and Fernando Camilo have compiled a list of neutron stars in binary clusters. [81, 82] Thirty five of these stars are not binary ones. Some clusters have seven non binary neutron stars. Even using very slow speeds the maximum escape time is less than one million years. This is in strong contrast to the billions of years assigned to by evolutionists.

Table 25. Paulo Freire

Globular Cluster Name	Non Binary Neutron Stars	Max Age 50 Km/Second	Max Escape Time 50 Km/Second
47 Tuc (NGC 104)	**7**	**352,678**	**319,194**
M15 (NGC 7078)	**7**	**16,069**	**526,963**
M22 (NGC 6656)	**1**	**3,885**	**296,115**
M28 (NGC 6626)	**1**	**6,342**	**173,658**
M5 (NGC 5904)	**1**	**21,380**	**458,620**
NGC 6440	**3**	**21,507**	**148,088**
NGC 6441	**2**	**7,323**	**260,671**
NGC 6517	**3**	**72,587**	**118,671**
NGC 6624	**4**	**10,357**	**459,749**
NGC 6752	**4**	**61,261**	**297,731**
NGC 6760	**1**	**5,047**	**270,953**
Terzan 5	**1**	**42,140**	**10,622**

Neutron Star Formation Rates

Scientists have calculated that one supernova happens in the galaxy every 50 years. [83-87] There are 100 thousand million stars in our galaxy. [88] We can use this to calculate what percentage of neutron stars are forming in globular clusters. The total number of neutron stars that have formed in any globular cluster will be determined by the following formula:

$$T = \frac{n}{N} \times \frac{A}{f} \qquad \textbf{(7)}$$

Where T = total formed
N = Number of stars in the Milky way Galaxy
n = Number of stars in the globular cluster
f = Years between supernovas formations in the galaxy
A = Age of the globular cluster

How many years are there between neutron stars forming in a given globular cluster in our galaxy?

$$Y = 1 \div \left(\frac{n}{N} \times \frac{1}{f} \right) \qquad \textbf{(8)}$$

Y = Years between each new neutron star formation in a globular cluster

Let us assume that there are Y years between each new birth in a globular cluster. What is the minimum escape speed so there is no more than one in the cluster at any given time during its lifetime?

$$V = \frac{r}{Y} c \qquad \textbf{(9)}$$

V = Minimum escape speed between formations
With an escape speed of just 13.7 kilometres per second there should only be one non binary neutron star in any globular cluster. Average neutron star speeds are twenty times this.

Table 26. Neutron Star Formation Rates

Statistical Summary	Maximum Possible Stars Formed	Years Between Star Formation	Escape Speed Km/Second
Average	1,146	43,100,787	2.296
Maximum	3,976	480,769,231	13.770
Minimum	25	3,333,333	0.013

The Globular Cluster Terzan 5

The Globular Cluster Terzan 5 contians at least twenty one neutron stars [89] and an evolutionist age of eleven billion years [90]. The distance formula [91] is used to analyse photos of the cluster to determine how far the neutron stars are from the centre. We import the globular cluster photos of Terzan 5 in the magazine articles [92] into Microsoft Paint. We then enter the X and Y positions of the centre of the cluster and the X and Y positions of each neutron star. We use the distance formula to calculate the distance in pixels the neutron stars are from the centre of the cluster. The magazine articles give the radius [7.9 arc minutes] of the photo in arc seconds.

$$a = \frac{R}{r} D$$

a = Distance in arc seconds the neutron star is from the centre of the cluster
R = Distance in pixels the neutron star is from the centre of the cluster in the photo
r = Radius in pixels of the photo
D = the radius of the photo in arc seconds

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

X_1 and Y_1 equal the globular clusters centre. X_2 and Y_2 equal the neutron stars location.

Table 27.

Statistical Summary	Escape Time 50 Km/Sec	Escape Time 100 Km/Sec	Escape Time 200 Km/Sec	Escape Time 300 Km/Sec	Escape Time 450 Km/Sec
Average	10,582	5,291	2,645	1,764	1,176
Maximum	16,139	8,070	4,035	2,690	1,793
Minimum	6,475	3,238	1,619	1,079	719

The Globular Clusters NGC 6440, NGC 6441

This research on two different globular clusters [93] was done in 2013 by scientist from Canada, USA and the Netherlands. If we use data from tables in the essay [94] we find the maximum age is only 25 thousand years old. According to an evolutionist astronomy magazine article, NGC 6441 is over 11 billion years old [73].

Table 28. NGC 6440 - Maximum Ages

NGC	Max Age	Max Age	Max Age	Max Age	Max Age
6440	50 Km/sec	100 Km/sec	200 Km/sec	300 Km/sec	450 Km/sec
Average	10,432	5,216	2,608	1,739	1,159
Maximum	25,819	12,910	6,455	4,303	2,869
Minimum	2,152	1,076	538	359	239

Table 29. NGC 6440 - Escape Times

NGC	Escape Time	Escape Time	Escape Time	Escape Time	Escape Time
6440	50 Km/sec	100 Km/sec	200 Km/sec	300 Km/sec	450 Km/sec
Average	290,671	145,335	72,668	48,445	32,297
Maximum	298,951	149,475	74,738	49,825	33,217
Minimum	275,283	137,642	68,821	45,881	30,587

Altogether there are five binary neutron stars systems spread between both clusters. The maximum ages for NGC 6440 and NGC 6441 is twenty five thousand years. This means the neutron star retention age is 450,400 times younger than the evolutionist age.

Table 30. NGC 6441 - Maximum Ages

NGC	Max Age	Max Age	Max Age	Max Age	Max Age
6441	50 Km/sec	100 Km/sec	200 Km/sec	300 Km/sec	450 Km/sec
Average	13,350	6,675	3,337	2,225	1,483
Maximum	25,428	12,714	6,357	4,238	2,825
Minimum	3,521	1,760	880	587	391

Table 31. NGC 6441 - Escape Times

NGC	Escape Time	Escape Time	Escape Time	Escape Time	Escape Time
6441	50 Km/sec	100 Km/sec	200 Km/sec	300 Km/sec	450 Km/sec
Average	519,213	259,606	129,803	86,535	57,690
Maximum	529,041	264,521	132,260	88,174	58,782
Minimum	507,134	253,567	126,784	84,522	56,348

The Globular Cluster Terzan 1

This research on this globular cluster [95] was done in 2006 by scientist from England, USA and the Netherlands. If we use data from the photo in the essay we find the maximum age is only 45 thousand years old.

Table 32. Escape Times

Statistical Summary	Escape Time 50 Km/Sec	Escape Time 100 Km/Sec	Escape Time 200 Km/Sec	Escape Time 300 Km/Sec	Escape Time 450 Km/Sec
Average	30,257	15,129	7,564	5,043	3,362
Maximum	45,308	22,654	11,327	7,551	5,034
Minimum	8,203	4,101	2,051	1,367	911

Table 33. Maximum Ages

Statistical Summary	Max Age 50 Km/Sec	Max Age 100 Km/Sec	Max Age 200 Km/Sec	Max Age 300 Km/Sec	Max Age 450 Km/Sec
Average	15,679	7,839	3,920	2,613	1,742
Maximum	37,733	18,867	9,433	6,289	4,193
Minimum	628	314	157	105	70

In 2006 evolutionist scientists from Russia admitted: "The hypothesis of high space velocities of young NSs immediately leads to the well-known problem of NS retention in GCs, since the escape velocity even in the densest clusters does not exceed several tens of km/sec. Most of the NSs born through the core collapse of massive stars should have escaped from the cluster shortly after its formation." [97] The maximum there should be per cluster is one.

The Globular Cluster M 30

This research on this globular cluster [98] was done in 2007 by scientist from the USA. If we use data from tables in the essay and process it the same way we processed Omega Centauri we find the maximum age is only 515 thousand years old. According to an evolutionist astronomy magazine article, NGC 7099 is over 12 billion years old [73, 74].

Table 34. Maximum Ages

Statistical Summary	Max Age 50 Km/sec	Max Age 100 Km/sec	Max Age 200 Km/sec	Max Age 300 Km/sec	Max Age 450 Km/sec
Average	110,497	55,248	27,624	18,416	12,277
Maximum	227,828	113,914	56,957	37,971	25,314
Minimum	513	257	128	86	57

Table 35. Escape Times

Statistical Summary	Escape Time 50 Km/sec	Escape Time 100 Km/sec	Escape Time 200 Km/sec	Escape Time 300 Km/sec	Escape Time 450 Km/sec
Average	405,503	202,752	101,376	67,584	45,056
Maximum	515,487	257,743	128,872	85,914	57,276
Minimum	288,172	144,086	72,043	48,029	32,019

The Globular Cluster M 71

This research on this globular cluster [99] was done in 2007 by scientist from the USA, Canada, The Netherlands, England and Germany. If we use data from tables [99] in the essay and process it the same way we processed Omega Centauri we find the maximum age is only 71 thousand years old. According to an evolutionist astronomy magazine article, NGC 6838 is over 12 billion years old [73, 74, 100].

Table 36. Maximum Ages

Statistical Summary	Max Age 50 Km/sec	Max Age 100 Km/sec	Max Age 200 Km/sec	Max Age 300 Km/sec	Max Age 450 Km/sec
Average	38,680	19,340	9,670	6,447	4,298
Maximum	68,068	34,034	17,017	11,345	7,563
Minimum	24,958	12,479	6,240	4,160	2,773

Table 37. Escape Times

Statistical Summary	Escape Time 50 Km/sec	Escape Time 100 Km/sec	Escape Time 200 Km/sec	Escape Time 300 Km/sec	Escape Time 450 Km/sec
Average	67,771	33,886	16,943	11,295	7,530
Maximum	71,400	35,700	17,850	11,900	7,933
Minimum	60,000	30,000	15,000	10,000	6,667

Binary Star Escape Velocities

One objection raised is that many of these neutron stars might originally be in binary star systems. Even though they are ejected out of the super nova explosion at a very high speed, the gravitational pull of the binary companion stops the star from exiting binary orbit. Thus they are held in securely to the globular cluster via the binary companion.

“About 5% of all neutron stars are members of a binary system.” [101, 102, 103]

“With the results of the observations reported here and the four already known MSPs, there are at least 5 neutron star systems in M 13. This makes M 13 the cluster with the fourth highest number of known neutron star systems. The retention of such a large number of neutron stars in a cluster with a relatively low central density remains to be explained (see for a comprehensive study of neutron star retention in globular clusters, Pfahl et al. 2002).” [104]

“The new Roche lobe under filling models have a 10 per cent retention factor of black holes and neutron stars. The retention of the remnants implies that the model clusters at older ages contain a large fraction of neutron stars which are more massive than the average stellar mass. Clusters with a large fraction of massive remnants will dissolve faster due to the higher average stellar mass. Also the depletion rate of low-mass stars could be different (Kruijssen 2009).” [105]

“It is estimated (Heinke et al. 2005) that 47 Tuc contains about 300 neutron stars.” [106]

“Both these functional forms are thus consistent with the observations of extragalactic X-ray binaries, but will most likely have trouble explaining the dearth of very low velocity pulsars, and simultaneously explaining the small, but non-neglible numbers of very high velocity pulsars (e.g. those with velocities of more than 800 km s-1) while still producing retention fractions greater than 1%, which is needed to explain the large numbers of X-ray binaries and millisecond pulsars in globular clusters.” [107]

“This seems to rule out the Hobbs et al. (2005) suggestion that the pulsar velocity kick distribution can be a single Maxwellian at 265 km s-1, unless the slower kicks in globular clusters are related to binary evolution (see e.g. Pfahl et al. 2002b; Dewi et al. 2005, for suggestions that binary evolution may affect pulsar kick velocities). It also indicates that the contribution of neutron stars from the fast mode in a distribution like that of Arzoumanian et al. (2002) to retention fractions should be negligible. These results are thus quite similar to the conclusions of Pfahl et al. (2002) who found that, while a single fast kick mode had trouble producing neutron star retention fractions large enough to match the observed numbers of millisecond pulsars in globular clusters like 47 Tuc, including also a slow velocity kick mode, and the effects of binaries could potentially solve the retention problem. With careful numerical simulations, the globular cluster X-ray binaries are likely to present the strongest constraints on the low velocity end of the pulsar kick velocity distribution, since field studies will always be complicated, e.g., by the intrinsic velocity dispersion in the field.” [107]

“In apparent conflict with the high speeds of isolated radio pulsars, Pfahl et al. (2002c) identified a new class of high-mass X-ray binaries (HMXBs) in which the NSs must have been born with relatively low kick speeds.” [108]

“To simultaneously account for the new class of HMXBs and the high speeds of radio pulsars, Pfahl et al. (2002c) suggested that NSs originating from progenitors that are single or members of wide binaries receive the conventional large kicks, while NSs born in close binaries receive small kicks (also see Katz 1975, 1983 and Hartman 1997 for earlier more ad hoc suggestions of a significant population of NSs with small natal kicks).” [109]

“Further observational evidence that at least some NSs receive low kicks at birth is provided by the fact that a large number of NSs are found in globular clusters; some massive globular clusters may contain more than 1000 NSs (Pfahl et al. 2002b). Since the central escape velocity is generally 50 km/sec, essentially all of the NSs born in a globular cluster should escape from the cluster if they received a kick consistent with the kick distribution for single radio pulsars (for a detailed discussion of this so-called neutron star retention problem, see Pfahl et al. 2002b).” [108]

In globular clusters there are frequent collisions and close encounters which can disrupt the binary system. If we have 50,000 binary pairs [110] with a companion mass between 1.25 and 10 solar masses what percentage will be retained in the cluster? Even with a massive companion [10 solar masses] only 10% would be retained.

Table 38. Binary star retention in Globular Clusters Gravity

Secondary Mass	1.25M	2.5M	5M	10M
Unbound	163	165	183	254
Mergers	0	0	0	15
Binary Mergers	0	0	14	279
Binaries	171	346	1135	4386
Total	334	511	1332	4934

Some of the previously listed data [The Toscano Catalogue, Hobbs Catalogue, The Wang Catalogue ,The Paulo Freire Catalogue, The Globular Clusters NGC 6440, NGC 6441] shows that binary neutron star systems have just as fast speeds as solo neutron stars.

Table 39. Binary star retention in Globular Clusters Gravity

Secondary Mass	1.25M	2.5M	5M	10M
Unbound	0.33%	0.33%	0.37%	0.51%
Mergers	0	0	0	0.03%
Binary Mergers	0	0	0.03%	0.56%
Binaries	0.34%	0.69%	2.27%	8.77%
Percent Retained	0.67%	1.02%	2.66%	9.87%
Not Retained	99.33%	98.98%	97.34%	90.13%

If we look at online catalogues [110] we see that out of 166 binary neutron stars, 153 have masses less than 1.25 solar mass. That means that 92% of binary pulsars are in the low mass range. Drukier comments: “These retention fractions have been integrated over the kick velocity distribution of Lyne & Lorimer (1994), and, as expected, very few single neutron stars are retained.” [111] According to the retention table if the kick velocity equals the escape velocity the maximum retention rate is 15.5%. Once the kick speed is 1.65 times the escape speed the retention rate is zero. If we look at tables previously mentioned in this essay we see that 99.999% of neutron stars will be ejected in a very short time.

Conclusion

There are over 20 galaxies [112] in the local Group. The two most massive members of the group are the Milky Way and the Andromeda Galaxy. These two Spiral galaxies each have a system of satellite galaxies. The calculations done show that the globular clusters in these systems are only thousands of years old and not the billions of years evolutionists affirm. A list of globular clusters in 422 galaxies [113] shows that the average number of clusters per galaxy is 1917. Since other galaxies [114, 115] have globular clusters with neutron stars it is reasonable to assume that they are only a few thousand years old also. This lines up with the Genesis creation account that these heavenly bodies were made on day four of the creation week, 6,000 years ago.

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