SunQM-1s2: Comparing to other star-planet systems, our Solar system has a nearly perfect {N,n//6} QM structure

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The major part of this work started from 2016.

Abstract

The Solar QM {N,n//6} structure has been successful not only for modeling the Solar system from Sun core to Oort cloud, but also in matching the size of white dwarf, neutron star and even black hole. In this paper, I have used this model to further scan down (and up) in our world. It is interesting to find that on the small end, the r(s) of hydrogen atom, proton and quark match {-12,1}, {-15,1} and {-17,1} respectively. On the large end, our Milky way galaxy, the Virgo super cluster have their r(s) match {8,1}, and {10,1} respectively. In a second estimation, some elementary particles like electron, up quark, down quark, … may have their {N,n} QM structures match {-17,1}, {-17,2}, {-17,3} … respectively. In a third estimation, the r(s) of super-massive black hole of Andromeda galaxy and Milky way galaxy match {2,1} and {1,1} respectively. However, so far the Solar QM {N,n} structure has not been re-produced in other exoplanetary systems (like TRAPPIST-1, HD 10180, Kepler-90, Kelper-11, 55-Cacri). So I propose that our Sun was formed from a single large seed (with size of Jupiter or even a red dwarf) and so that it has the almost perfect {N,n} QM structure. Therefore it reflects the true G-force (and F4-degenerated-force) formed QM in our universe.

Introduction

In my previous papers SunQM-1 and SunQM-1s1 [1], I discovered Solar QM {N,n//6} structure with Sun surface at {0,2}, and Earth orbit at {1,5}o. The Solar system was actually formed through a series of quantum collapse of pre-Sun ball from {6,1} down to the current {0,1}, and it will further collapse to a white dwarf in size of {-1,1}. During this star evolution, a mass QM {N,n} structure collapse is accompanied by a heat QM {N,n} structure expansion. The mass QM {N,n} structure collapse can go down to {-5,1} black hole, or even below. The heat QM {N,n} structure expansion can go beyond {5,1} (like Crab Nebula supernova's current size is {5,2} and it is still expanding). This study leads me to further explore the even larger (and smaller) world by using the Solar QM {N,n//6} structure analysis.

In current paper, I try to use our Solar system's QM {N,n//6} structure as the ruler to analyze our world from string size to universe size, and also try to find out the eligibility that why I can do that. Note: Microsoft Excel's number format is often used in this paper, for example: x^2 = x^2, 3.4E+12 = $3.4*10^{12}$, 5.6E-9 = $5.6*10^{-9}$.

I. Using Solar QM {N,n//6} structure analysis to scan from size of string to universe

Table 1 shows a {N,n//6} scanning from size of string to universe. The Cold-G r-track (columns 3 to 5) uses Sun-mass black hole {-3,1} 's r =2.95E+3 meters as reference point for calculation (so no hydrogen fusion heating caused r expansion effect). The Hot-G r-track (columns 6 to 8) uses Sun surface {0,2} 's r =6.96E+8 meters as reference point for calculation (so with hydrogen fusion heating effect). Columns 9 to 11 use proton {-15,1} 's r =8.4E-16 meters as reference point for calculation (so it is equivalent to a even higher heating effect due to the even larger r). Columns 12 to 14 use electron's n=1 at {-12,1} 's r =5.29E-11 meters as reference point for calculation (and it is equivalent to a ultra higher heating effect due to the ultra larger r). Although it is better to use different r-track for different size, for simplicity, I only use Cold-G r-track for all sizes (from macro- to micro-world) in this paper. Columns 15-16 shows the object correlated to this size, and the best fitted super-shell-set in ΔN=5. Column 17 shows the ΔN=5 super-shell-set that do not belong to the regular super-shell-set (in columns 15-16). Column 18 shows the K super-super shell, with the assumption that N super-shell is also a base number = 5*6^ QM structure.

Table 1. {N,n//6} from string to universe. Start from 1) Sun black hole {-3,1} r= 2.95E+3 m, 2) Sun core {0,1} r=1.74E+8 meters, 3) proton {-15,1} r= 8.4E-16 m, 4) r=5.29E-11 meters, using ΔN = ±1 (or 36×) to scan up and down.

N=	total n=	Cold-G r track			Hot-G r track			proton r track			electron(n=1) r track			object correlated	{K,N//6,n//6}
		m	AU	ly	m	AU	ly	m	AU	ly	m	AU	ly		
-29	2.71E-23	1.01E-37			1.28E-37			1.37E-37			1.85E-37				
-28	1.63E-22	3.65E-36			4.61E-36			4.92E-36			6.65E-36			{-28,4} Planck length 1.6E-35	
-27	9.77E-22	1.31E-34			1.66E-34			1.77E-34			2.39E-34				
-26	5.86E-21	4.73E-33			5.98E-33			6.38E-33			8.61E-33				
-25	3.52E-20	1.70E-31			2.15E-31			2.30E-31			3.10E-31			{-25,1}	{-5,0,1}
-24	2.11E-19	6.13E-30			7.75E-30			8.27E-30			1.12E-29				
-23	1.27E-18	2.21E-28			2.79E-28			2.98E-28			4.02E-28				
-22	7.60E-18	7.94E-27			1.00E-26			1.07E-26			1.45E-26				
-21	4.56E-17	2.86E-25			3.61E-25			3.86E-25			5.21E-25				
-20	2.74E-16	1.03E-23			1.30E-23			1.39E-23			1.88E-23			{-20,1}	{-4,0,1}
-19	1.64E-15	3.71E-22			4.68E-22			5.00E-22			6.75E-22				
-18	9.85E-15	1.33E-20			1.69E-20			1.80E-20			2.43E-20				
-17	5.91E-14	4.80E-19			6.07E-19			6.48E-19			8.75E-19			[-17,1} quark r=4.3E-19	
-16	3.54E-13	1.73E-17			2.19E-17			2.33E-17			3.15E-17				
-15	2.13E-12	6.23E-16			7.87E-16			***8.40E-16***			1.13E-15			{-15,1} proton r=8.4E-16	{-3,0,1}
-14	1.28E-11	2.24E-14			2.83E-14			3.02E-14			4.08E-14				
-13	7.66E-11	8.07E-13			1.02E-12			1.09E-12			1.47E-12				
-12	4.59E-10	2.90E-11			3.67E-11			3.92E-11			***5.29E-11***			{-12,1} H-atom r	
-11	2.76E-09	1.05E-09			1.32E-09			1.41E-09			1.90E-09			[-11,1} Pb atom r=1.8E-9	
-10	1.65E-08	3.76E-08			4.76E-08			5.08E-08			6.86E-08			{-10,1} 50 nm	{-2,0,1}
-9	9.92E-08	1.36E-06			1.71E-06			1.83E-06			2.47E-06				
-8	5.95E-07	4.88E-05			6.17E-05			6.58E-05			8.89E-05				
-7	3.57E-06	1.76E-03			2.22E-03			2.37E-03			3.20E-03				
-6	2.14E-05	6.32E-02			7.99E-02			8.53E-02			1.15E-01				
-5	1.29E-04	2.28E+00			2.88E+00			3.07E+00			4.15E+00			{-5,1} meter	{-1,0,1}
-4	7.72E-04	8.19E+01			1.04E+02			1.11E+02			1.49E+02				
-3	4.63E-03	***2.95E+03***			3.73E+03			3.98E+03			5.37E+03			{-3,1} Sun black hole r=2.95E+3	
-2	2.78E-02	1.06E+05			1.34E+05			1.43E+05			1.93E+05				
-1	1.67E-01	3.82E+06			4.83E+06			5.16E+06			6.96E+06			{-1,1} Earth size	
0	1	1.38E+08			***1.74E+08***			1.86E+08			2.51E+08			Sun core g{0,1} gravity-r	{0,0,1}
1	6	4.95E+09			6.26E+09			6.69E+09			9.02E+09				
2	36	1.78E+11	1.19E+00		2.25E+11	1.51E+00		2.41E+11	1.61E+00		3.25E+11	2.17E+00		Mars {2,1}	
3	216	6.42E+12	4.29E+01		8.11E+12	5.42E+01		8.66E+12	5.79E+01		1.17E+13	7.82E+01		Kuiper belt {3,1}	
4	1296	2.31E+14	1.55E+03	2.44E-02	2.92E+14	1.95E+03	3.09E-02	3.12E+14	2.08E+03	3.30E-02	4.21E+14	2.81E+03	4.45E-02	Oort begin {4,1}	
5	7776	8.32E+15	5.56E+04	8.80E-01	1.05E+16	7.03E+04	1.11E+00	1.12E+16	7.51E+04	1.19E+00	1.52E+16	1.01E+05	1.60E+00	Oort end {5,1}	{1,0,1}
6	4.67E+04	3.00E+17	2.00E+06	3.17E+01	3.79E+17	2.53E+06	4.00E+01	4.04E+17	2.70E+06	4.27E+01	5.46E+17	3.65E+06	5.77E+01		
7	2.80E+05	1.08E+19	7.21E+07	1.14E+03	1.36E+19	9.11E+07	1.44E+03	1.46E+19	9.73E+07	1.54E+03	1.96E+19	1.31E+08	2.08E+03		
8	1.68E+06	3.88E+20	2.60E+09	4.10E+04	4.91E+20	3.28E+09	5.19E+04	5.24E+20	3.50E+09	5.54E+04	7.07E+20	4.73E+09	7.47E+04	{8,1} Milky way, r=5~9E+4 ly	
9	1.01E+07	1.40E+22	9.34E+10	1.48E+06	1.77E+22	1.18E+11	1.87E+06	1.89E+22	1.26E+11	1.99E+06	2.55E+22	1.70E+11	2.69E+06	{9,1} to Andromeda Galaxy, {9,2} local group	
10	6.05E+07	5.03E+23	3.36E+12	5.32E+07	6.36E+23	4.25E+12	6.72E+07	6.79E+23	4.54E+12	7.18E+07	9.16E+23	6.13E+12	9.69E+07	{10,1} Virgo SupClst r=5.5E+7 ly	{2,0,1}
11	3.63E+08	1.81E+25	1.21E+14	1.91E+09	2.29E+25	1.53E+14	2.42E+09	2.44E+25	1.63E+14	2.58E+09	3.30E+25	2.21E+14	3.49E+09	{10,2} Laniakea r=2.6E+8ly	
12	2.18E+09	6.52E+26	4.36E+15	6.89E+10	8.24E+26	5.51E+15	8.71E+10	8.80E+26	5.88E+15	9.30E+10	1.19E+27	7.94E+15	1.26E+11	{11,5} observ Univ r=4.4E+26	
13	1.31E+10	2.35E+28	1.57E+17	2.48E+12	2.97E+28	1.98E+17	3.14E+12	3.17E+28	2.12E+17	3.35E+12	4.28E+28	2.86E+17	4.52E+12	{13,1} our Universe?	
14	7.84E+10	8.45E+29	5.65E+18	8.93E+13	1.07E+30	7.14E+18	1.13E+14	1.14E+30	7.62E+18	1.21E+14	1.54E+30	1.03E+19	1.63E+14		
15	4.70E+11	3.04E+31	2.03E+20	3.22E+15	3.85E+31	2.57E+20	4.06E+15	4.11E+31	2.74E+20	4.34E+15	5.54E+31	3.70E+20	5.86E+15	{15,1} our universe?	{3,0,1}
16	2.82E+12	1.10E+33	7.32E+21	1.16E+17	1.38E+33	9.25E+21	1.46E+17	1.48E+33	9.88E+21	1.56E+17	1.99E+33	1.33E+22	2.11E+17		
17	1.69E+13	3.94E+34	2.64E+23	4.17E+18	4.98E+34	3.33E+23	5.27E+18	5.32E+34	3.56E+23	5.62E+18	7.18E+34	4.80E+23	7.59E+18		
18	1.02E+14	1.42E+36	9.49E+24	1.50E+20	1.79E+36	1.20E+25	1.90E+20	1.92E+36	1.28E+25	2.02E+20	2.59E+36	1.73E+25	2.73E+20		
19	6.09E+14	5.11E+37	3.42E+26	5.40E+21	6.46E+37	4.32E+26	6.83E+21	6.90E+37	4.61E+26	7.29E+21	9.31E+37	6.22E+26	9.84E+21		
20	3.66E+15	1.84E+39	1.23E+28	1.94E+23	2.32E+39	1.55E+28	2.46E+23	2.48E+39	1.66E+28	2.62E+23	3.35E+39	2.24E+28	3.54E+23		{4,0,1}
21	2.19E+16	6.62E+40	4.43E+29	7.00E+24	8.37E+40	5.59E+29	8.85E+24	8.94E+40	5.97E+29	9.45E+24	1.21E+41	8.06E+29	1.27E+25		
22	1.32E+17	2.38E+42	1.59E+31	2.52E+26	3.01E+42	2.01E+31	3.18E+26	3.22E+42	2.15E+31	3.40E+26	4.34E+42	2.90E+31	4.59E+26		
23	7.90E+17	8.58E+43	5.74E+32	9.07E+27	1.08E+44	7.25E+32	1.15E+28	1.16E+44	7.74E+32	1.22E+28	1.56E+44	1.04E+33	1.65E+28		
24	4.74E+18	3.09E+45	2.07E+34	3.27E+29	3.91E+45	2.61E+34	4.13E+29	4.17E+45	2.79E+34	4.41E+29	5.63E+45	3.76E+34	5.95E+29		
25	2.84E+19	1.11E+47	7.44E+35	1.18E+31	1.41E+47	9.40E+35	1.49E+31	1.50E+47	1.00E+36	1.59E+31	2.03E+47	1.35E+36	2.14E+31	{25,1} our universe?	{5,0,1}

Correlates {N,n} sizes to the known objects:

{-18,1} and more negative, different size of strings (see wiki "Orders_of_magnitude_(length)").

{-17,1} size of quark in r. According to [3].
{-15,1} size of proton in r.
{-3,1} size of Sun-mass black hole in r.
{0,1} size of Sun core in r.
{5,1} size of Solar system (Oort ends) in r.
{8,1} size of Milky Way in r (see wiki "Milky way", diameter = 1E+5 light years).
{8,2} size of Milky way Gaseous Halo, r =2E+5 lys (see wiki "Milky way",).
{9,2} size of local group, r =5E+6 lys (see wiki "local group", d=10E+6 lys).
{10,1} size of Virgo super cluster in r (see wiki "Virgo Supercluster", d= 1.1E+8 light years).
{10,2} Laniakea r=2.6E+8ly, (see wiki "Laniakea Supercluster").
{11,5} observable universe, r=4.4E+26 m, (see wiki "Observable universe").

Result & discussion (for Table 1):
1) In Table 1, proton's r is at {-15,1}. If proton's r = 8.4E-16 meters is correct and accurate, then we can use the super stable state {-15,1} as a standard point to construct {N,n} 's r, named proton-r track. Then proton-r track is ~35% larger than gravity-r track, or ~7% larger than heated-r track. Since the proton size should be the same everywhere in the universe, and if ΔN=+15 of proton is Sun size at {0,1}, then our Sun is ~6% smaller than proton-r track's Sun. Does this mean our Sun is ~6% smaller (in r) than the averaged star?

2) Bohr radius is at {-12,1}. If we use r=5.29E-11 m as the standard point to construct {N,n} 's r (named "e1-r-track"), then e1-r-track is 82% larger than gravity-r-track, 44% larger than heated-r-track, and 35% larger than proton-r-track.

3) While Virgo super cluster is a super stable structure {10,1}, Laniakea r=2.6E+8ly is not. It is only about {10,2} in size. So Lanikea is only a first excited state sized {N,n} QM structure of the ground state sized Virgo super cluster. The next higher level of super cluster at {11,1} should be 36× larger than Virgo Super cluster {10,1}, or ~ 9× larger than Laniakea {10,2}. It should contain Shapley Supercluster because The Great Attractor is moving towards the Shapley Supercluster (see wiki "Laniakea Supercluster").

4) A {K,N//6,n//6} QM structure is proposed, with both N and n are base-5*6^ number. Also {N,1} states at N=0, ±5, ±10, ±10, ±15, … are proposed to be the super-super stable QM structures (see Table 1 columns 15-16). It is quite obvious that proton {-15,1}, Sun core {0,1}, Solar system edge {5,1}, Virgo super cluster {10,1} are reasonable to be the super-super {K,N,n} QM structures. {-5,1} is explained as the super stable black hole structure after {-3,1}. On the small side, {-17,1} quark and {-12,1} hydrogen atom should also be the fundamental building blocks of our universe, but are not super-super stable QM structures in {K,N,n} model. It is puzzled to me. However, the result in paper SunQM-5 shows that {-17,1} quark and {-12,1} hydrogen atom forms its own ΔN=5 super stable set (see column 17 in Table 1), and is directly related to the collapse of Sun from {0,1} to {-5,1} black hole. On the larger side, {8,1} galaxies are expected to be the fundamental building blocks of our universe, but they are not super-super stable QM structures in {K,N,n} model. It is also puzzling. Is it possibility that {8,1} galaxy forms its own ΔN=5 super stable set and end at {13,1} (see column 17 in Table 1)? If so, then what is {13,1}? Is it the size of our universe? The possible non-linearity of space at extreme larger end is not considered so far.

5) So far there is no obvious known object has the size that suitable for{-10,1} super stable structure. However in paper SunQM-5, {-10,1} is calculated to be the size of a maximum (ever possible) atom.

6) Planck length 1.6E-35 m (see wiki "Planck length") is {-28,4} in {N,n} scale. The possible non-linearity of space at extreme small end is not considered so far.

II. Can I use {N,n} QM structure to estimate the size of elementary particles?

Now I need to find more experimental data to support the {N,n} QM structure analysis. One set of data is the elementary particles. Although all of them have the experimental data of mass (or energy), but for most of them the size information is missing. In Table 2, I list the mass data for a set of elementary particles (copied from wiki "Elementary particle", Table of "Current values for elementary fermion masses", and from wiki "Orders of magnitude (length)", Table of "Subatomic"). I try to estimate the size from the mass data using {N,n} QM structural analysis. After some tries, I realized that within certain mass range, the elementary particle mass and r can be (roughly) simplified as linear relationship. So in Table 2, I use proton's known mass (m_1=938 MeV/c^2) and size (r_1=8.4E-16) as the reference point, plus assign proton has total n=36, then calculate out the total n = sqrt(r/r_1) = sqrt(m/m_1) for each particle (in columns 3 and 4), then use r = r_1 *n^2 to calculate out their size (see results in column 5).

One interesting thing is, comparing to electron's m=0.511 MeV/c^2, Up quark's mass =4×, Down quark's mass = 9×. It is exactly n=1, 2, 3 relationship! This is unlikely to the accidental match. Based on this, I made simple calculation in Table 2 which shows that if proton has {2,1//6} QM structure with r =8.4E-16 m, then electron can be estimated to have {0,1//6} QM structure with r =4.6E-19 m, Up quark has {0,2//6} QM structure with r =1.7E-18 m, and Down quark has {0,3//6} QM structure with r =3.9E-18 m. (Note: in paper SunQM-5, we will see that the interior {N,n} QM analysis should be used for this kind of {N,n} analysis).

One important point here is that usually we need (at least) two reference points to determine a linear fitting line. Here I only need one reference point to define a linear fitting line because its slop is pre-defined by {N,n//6} model. So if the fitted result meets the expectation, then it means the slop (or the {N,n//6} QM structure model) is right for this set of data.

Table 2. Size (in r) estimation for some elementary particles by using {N,n} QM structure analysis with the proton as reference point.

	mass	n= sqrt(m/m_1* 36)	assigned {N,n//6}	r =r_1 *n^2
	MeV/c^2			m
neutrino	0.14	0.4		
Electron	0.511	0.8	{0,1}	4.58E-19
Up quark	1.9	1.6	{0,2}	1.7E-18
Down quark	4.4	2.5	{0,3//6}	3.94E-18
Strange quark	87	11.0	{1,2//6}	7.79E-17
Muon	105.7	12.1	{1,2//6}	9.47E-17
Charm quark	1320	42.7	{2,1//6}	1.18E-15
Tauon (tau lepton)	1780	49.6	{2,1//6}	1.59E-15
Bottom quark	4240	76.5	{2,2//6}	3.8E-15
Top quark	172700	488.5	{3,2//6}	1.55E-13
proton	938	36.0	{2,1//6}	8.4E-16

Table 3 follows wiki "Quark, (Table 'Generation of matter')", and I added the new information of {N,n//6} QM structure to each particle. So (if correct), the {N,n} QM structure analysis may provide not only a independent method to estimate the size of elementary particles, but also some QM state information for these particles. I do not have much knowledge of elementary particle physics, but I do hope that this result will help elementary particle physicists for their study.

Table 3. wiki "Quark (Table 'Generation of matter')", with the new {N,n//6} QM structure information added-in for each particle.

Type	First	Second	Third
Quarks			
up-type	up	charm	top
	{0,2}	{2,1}	{3,2}
down-type	down	srange	bottom
	{0,3}	{1,2}	{2,2}
Leptons			
charged	electron	muon	tau
	{0,1}	{1,2}	{2,1}
	electron	muon	tau
neutral	neutrino	neutrino	neutrino
	?	?	?

As I mentioned, the simplified m ∝ r linear relationship is only good within certain mass range for the elementary particle mass. This is just like that although for stellar black hole, mass and r has a linear relationship (r=2.95 * M/M_{sun}, unit =km, see wiki "black hole"), but for general celestial body, there is no this kind of simply relation.

III. Using Solar QM {N,n} structure to analyze the size of the supermasive black hole in galaxy's center.

Again I try to find some more experimental data to support the {N,n} QM structure analysis. Andromeda Galaxy (see wiki "Andromeda Galaxy") has a supermasive black hole (SMBH) with ~ 1.1E+8 of Sun mass, so its Schwarzschild radius =2.95E+3 * 1.1E+8 =3.24E+11 meters, or about {2,1} in size (according to Table 1). Interestingly, this SMBH's r of {2,1} is ΔN = +5 larger than a stellar's black hole {-3,1} ! Similar as that a stellar black hole {-3,1} has a super-stable core at {-5,1}, or ΔN = -2 smaller than its Schwarzschild radius (-3,1), SMBH may also have a super-stable core ΔN = -2 smaller, or at {0,1} in size, which means SMBH's super-stable core {0,1} is also ΔN = +5 larger than stellar {-5,1}. Because it has no quasar effect, Andromeda Galaxy can be explained as a matured galaxy with SMBH ΔN = +5 larger than a stellar black hole.

Comparing to Andromeda Galaxy's total mass (~1.5E+12 M_{sun}), Milky Way galaxy's total mass is about 0.5× to 1× (~0.8 to 1.5E+12 M_{sun} , see wiki "Milky way galaxy"). So Milky Way is also expected to have a SMHB with Schwarzschild radius at size of around {2,1}, and a super stable SMBH core at {0,1}. However, the current data shows its SMBH mass = 4.1E+6 of M_{sun} , so r_{Sch} =1.21E+10 m, or ≥ {1,1} in size (according to Table 1). One possible explanation is that Milky Way probably is a pre-matured galaxy with SMBH only ΔN = +4 larger than stellar black hole, so it is still growing its SMBH to ΔN = +5. The newly observed Fermi bubbles and bipolar jets of Milky Way may favor this idea.

IV. Comparing to other star-planet systems, our Solar system has a nearly perfect {N,n} QM structure.

It has been known for a while that comparing to most of other exoplanets, our Solar system's Jupiter is very far away from Sun. It has always puzzled me that why our Solar system's {N,n//6} QM structure can be scaled down to quark size and up to Virgo super cluster size as shown in Table 1. By studying several other star-planet systems, I try to find the answer for this question. From Table 4 through Table 8, the orbit r and the mass of five exo-planetary systems (TRAPPIST-1, HD 10180, Kepler90, Kepler11, and 55-Cancri-A) are listed. The first thing I am looking for is where is r_1 (relative to the surface r), then I try to find a best pfactor to fit a {N,n//pFactor} QM structure. To do this, I search for a set of quantum number n = sqrt(r/r_1) that are small (and sequential) integers for the major planets (as explained in paper SunQM-1). For detailed explanation on how this works, please check the introduction of paper SunQM-1s3.

IV-a. TRAPPIST-1

Table 4. Using {N,n} QM structure to study TRAPPIST-1 planetary system.

	mass	orbit-r	orbit-r	orbit-v	n=sqrt(r/r1)						n=sqrt(r/r1)	
	kg	m	AU	m/s								
r1 scsale up/down					1	1/4	1/9	1/16	1/25	1/36	1.2	
r1=					7.65E+07	1.91E+07	8.50E+06	4.78E+06	3.06E+06	2.13E+06	9.18E+07	
Trappist-1	1.59E+29	7.65E+07			1.00	2.00	3.00	4.00	5.00	6.00	0.91	{0,1}
Trappist-1b	4.72E+24	1.655E+09	0.01111	7.97E+04	4.65	9.30	13.95	18.60	23.25	27.91	4.25	{0,4}
Trappist-1c	9.73E+24	2.268E+09	0.01522	6.81E+04	5.44	10.89	16.33	21.77	27.22	32.66	4.97	{0,5}
Trappist-1d	1.97E+24	3.196E+09	0.02145	5.74E+04	6.46	12.92	19.39	25.85	32.31	38.77	5.90	{0,6}
Trappist-1e	1.43E+24	4.199E+09	0.02818	5.01E+04	7.41	14.81	22.22	29.63	37.04	44.44	6.76	{0,7}
Trappist-1f	2.15E+24	5.528E+09	0.0371	4.37E+04	8.50	17.00	25.50	34.00	42.50	50.99	7.76	{0,8}
Trappist-1g	3.38E+24	6.72E+09	0.0451	3.96E+04	9.37	18.74	28.11	37.48	46.85	56.22	8.55	{0,9}
Trappist-1h	5.13E+23	8.88E+09	0.0596	3.44E+04	10.77	21.54	32.32	43.09	53.86	64.63	9.83	{0,10}

According to wiki"TRAPPIST-1", TRAPPIST-1 is an ultra-cool red dwarf star. Distance (to Earth) =39.6 ly. Mass=8% of Sun, 84× of Jupiter. Body-r = 11% of Sun. T=2516 K. Age = 3-8 Gyr. Rotation =3.3 days. Seven planets have been detected.

Result and discussion (of Table 4):

1) In Table 4, if we increase the r_1 from TRAPPIST-1's surface r to 1.2X, then its seven planets fits to a set of orbits {0,n=4..10}o very well (see columns 11-12). Like that in Solar quantum {N,n//6} structure Periodic Table (paper SunQM-1, Table 4), between {N,6//6} and {N+1,1//6}={N,12/6}, there are weak orbits {N,n=7..11/6} available. So for a star, there are strong orbits {0,n=1…5//6}o, weak orbits {0,n=7…11//6}o, and then strong orbits {1,n=1..5//6}o.

2) Because TRAPPIST-1 is an ultra-cool red dwarf star, so the simplest explanation is that the original Trappist-sun (red dwarf)'s surface r =1.2×, now it cooled down and shrink to 1×. All seven planets' orbits were formed before Trappist-sun cool down.

3) Name Trappist-1's {N,n} QM structure as Trp{N,n}. So the Trp{N,n} QM structure can be fit into a {N,n//6} QM structure.

IV-b. HD 10180

Table 5. Using {N,n} QM structure to study HD10180 planetary system.

	mass	orbit-r	orbit-r	orbit-v	n=sqrt(r/r1)													r1 =		r1 =	
	kg	m	AU	m/s														0.95			
r1 scsale up/down					1	1/4	1/9	1/16	1/25	1/36	r1=1X	9		8		6		6		1/4	
r1=					8.35E+08	2.09E+08	9.28E+07	5.22E+07	3.34E+07	2.32E+07	n=	n/9=		n/8=		n/6=		n/6=		2.09E+08	
HD10180	2.11E+30	8.35E+08			1.00	2.00	3.00	4.00	5.00	6.00	1		{0,1}		{0,1}		{0,1}	7.93E+08	{0,1}	2.00	{0,2}
HD10180b	7.76E+24	3.311E+09	0.02222	2.04E+05	1.99	3.98	5.97	7.97	9.96	11.95	2		{0,2}		{0,2}		{0,2}	2.04	{0,2}	3.98	{0,4}
HD10180c	7.76E+25	9.551E+09	0.0641	1.21E+05	3.38	6.76	10.15	13.53	16.91	20.29	3		{0,3}		{0,3}		{0,3}	3.47	{0,3}	6.76	{0,7}
HD10180i	1.13E+25	1.347E+10	0.0904	1.01E+05	4.02	8.03	12.05	16.07	20.08	24.10	4		{0,4}		{0,4}		{0,4}	4.12	{0,4}	8.03	{0,8}
HD10180d	7.10E+25	1.913E+10	0.1284	8.51E+04	4.79	9.57	14.36	19.15	23.94	28.72	5		{0,5}		{0,5}		{0,5}	4.91	{0,5}	9.57	{0,9}
HD10180e	1.49E+26	4.023E+10	0.27	5.88E+04	6.94	13.88	20.83	27.77	34.71	41.65	7		{0,7}	0.88	{0,7}	1.17	{0,7}	1.19	**{1,1//6}**	13.88	**{1,2//6}**
HD10180j	3.04E+25	4.917E+10	0.33	5.29E+04	7.67	15.35	23.02	30.70	38.37	46.05	8		{0,8}	1.00	{0,8}={1,1/	1.33	{0,8}={1,1/	1.31		15.35	
HD10180f	1.43E+26	7.344E+10	0.4929	4.35E+04	9.38	18.76	28.14	37.52	46.90	56.28	9	1.00	{0,9}={1,1/	1.13	{1,1//8}	1.50	{1,1//8}	1.60	**{1,2//6}**	18.76	**{1,3//6}**
HD10180g	1.28E+26	2.108E+11	1.415	2.57E+04	15.89	31.78	47.68	63.57	79.46	95.35	16	1.78	{1,2//9}	2.00	{1,2//8}	2.67	{1,2//8}	2.72	**{1,3//6}**	31.78	**{1,5//6}**
HD10180h	3.93E+26	5.2E+11	3.49	1.64E+04	24.96	49.92	74.87	99.83	124.79	149.75	25	2.78	{1,3//9}	3.13	{1,3//8}	4.17	{1,3//8}	4.27	**{1,4//6}**	49.92	**{2,1//6}**

According to wiki "HD 10180", it is a Sun-like star. Distance (to Earth) = 127 lys. Body-r = 1.2× of Sun's. Mass = 1.062× of Sun's. Rotation= 24 days. Age=7.3 billion years old. Seven planets have been detected.

Result and discussion (of Table 5):

1) HD10180 seems has an almost perfect {N,n//9} QM structure, with r_1 at its sun surface.

2) HD10180e has > 25× Earth-mass, suggesting that it is a gas planet. If so, then the ice-evap-line < 0.27AU, or maybe at ~0.13 AU near {0,5}. The giant gas planet close to star may suggest that the final collapse had much less violent collision/explosion, so that the explored heat ball is small (<< 0.13 AU).

According to one of my fitting results (see some data below), it is possible that the HD10180's last collision was between a big pre-sun (95% of current-r) and a relative small (Jupiter-sized) celestial body, The big pre-sun had 4 planets (e, f, g, h, each with 20× to 60× of Earth-mass) at {1,1//6}, {1,2//6}, {1,3//6}, and {1,4//6} orbits, with or without planets b, c, i, d at orbit {0,n=2..5}o. The collision/merge of these two pre-suns caused explosion, and ejected mass formed (or re-enforced) planets b, c, i, d at orbit of {0,n=2..5}o. Meanwhile the old 4 planets (e, f, g, h) still pretty much retained their original orbit. So this collision increased HD10180 surface-r from 95% to current 100%, and confused {N,n} QM structure from the original {N,n//6} to the current kind-of {N,n//9}. Suppose the mass density is constant, it is equivalent to a pre-sun with r = 4.36E+8 m, and mass=3E+29 kg (6× Jupiter's r and 158× Jupiter's mass), collided with a 95% r (r = 7.93E+8 m) of pre-sun, increase the r to 100%. In the real situation, it is more like that the increase of r from 95% to 100% was through a series of collisions, each with Jupiter-sized celestial body with mass << 3E+29 kg.

3) Name HD10180's {N,n} QM structure as HD{N,n}. So the HD{N,n} QM structure can be fitted into a {N,n//6} QM structure with {1,n=1..4//6} come from a previous pre-sun of 95% r. Although it may also be a {N,n//9}, or a {N,n//8} QM structure.

IV-c. Kepler-90

Table 6. Using {N,n} QM structure to study the Kepler-90 planetary system.

	mass	orbit-r	orbit-r	orbit-v	n=sqrt(r/r1)										n=sqrt(r/r1)			
	kg	m	AU	m/s							r1=1/5		r1=1/7.2					
r1 scsale up/down					1	1/4	1/9	1/16	1/25	1/36	0.2		0.138889		1		1/4	
r1=					8.35E+08	2.09E+08	9.28E+07	5.22E+07	3.34E+07	2.32E+07	1.67E+08		1.16E+08		8.35E+08		2.09E+08	
Kep90	2.39E+30	8.35E+08			1.00	2.00	3.00	4.00	5.00	6.00	2.24	0.4 {0,3//6}	2.68	0.4 {0,3//6}	1.00	{0,1//6}	2.00	{0,2//6}
Kep90b		1.103E+10	0.074	1.14E+05	3.63	7.27	10.90	14.54	18.17	21.81	8.13	1.4	9.75	1.6	3.63	{1,4//6}	7.27	{1,7//6}
Kep90c		1.326E+10	0.089	1.11E+05	3.99	7.97	11.96	15.94	19.93	23.91	8.91	1.5 {1,2//6}	10.69	1.8 {1,2//6}	3.99	{1,4//6}	7.97	{1,8//6}
Kep90i		1.839E+10	0.1234	9.25E+04	4.69	9.39	14.08	18.77	23.46	28.16	10.49	1.7 {1,2//6}	12.59	2.1 {1,2//6}	4.69	{1,5//6}	9.39	{1,9//6}
Kep90d		4.768E+10	0.32	5.80E+04	7.56	15.11	22.67	30.23	37.79	45.34	16.90	2.8 {1,3//6}	20.28	3.4 {1,3//6}	7.56	{1,7//6}	15.11	{2,2.5//6}
Kep90e		6.258E+10	0.42	4.95E+04	8.66	17.32	25.97	34.63	43.29	51.95	19.36	3.2 {1,3//6}	23.23	3.9 {1,4//6}	8.66	{1,9//6}	17.32	{2,3//6}
Kep90f		7.152E+10	0.48	4.16E+04	9.26	18.51	27.77	37.02	46.28	55.53	20.70	3.4 {1,3//6}	24.84	4.1 {1,4//6}	9.26	{1,9//6}	18.51	{2,3//6}
Kep90g	<0.8Mj	1.058E+11	0.71	3.65E+04	11.26	22.51	33.77	45.03	56.28	67.54	25.17	4.2 {1,4//6}	30.21	5.0 {1,5//6}	11.26	{2,1//6}	22.51	{2,3.7//6}
Kep90h	<1.2Mj	1.505E+11	1.01	3.30E+04	13.43	26.85	40.28	53.70	67.13	80.56	30.02	5.0 {1,5//6}	36.03	6.0 {1,6//6}	13.43	{2,1//6}	26.85	{2,4.5//6}

According to wiki "Kepler-90", Kepler-90 is a G-type star. Distance (to Earth) = 2545 lys. Body-r = 1.2× of Sun's. Rotation = unknown days. Age = 2 billion years old. Eight planets have been detected.

Result and discussion (of Table 6):

1) No obvious {N,n//pfactor} can be found for Kepler-90 planetary system.

2) Kepler90 has 1.2× of Sun's mass and r, so I assume that it has the same {N,n//6} QM system as our Solar QM {N,n//6} structure. The simplest possible explanation is: At early stage of Kepler-90 formation, there were hundreds of small pre-Suns with Jupiter size, each may have its own small planetary system. Then almost all of these small pre-Suns crashed with each other (one by one) to form a big Kepler-90, and all the original small planetary systems were destroyed. Only eight (or less) of these small (Jupiter-sized) pre-Suns, instead of crash into the big pre-Sun, were captured by the big pre-Sun at different stage. Their small planetary systems were also destroyed by either crashed into the Kepler-90, or stripped off and become one of the eight Kepler-90's planets. So today Kepler-90's eight planets have strange (random) orbits because they were captured at different stage of pre-Sun forming with different r_1.

In studying the exo-planetary systems, since most of them do not have a clear {N,n} QM structure, here I make a hypothesis about their origination:

1) All planets in {0,n=1..5}o orbits are possible originated from

a) ejected mass of pre-Suns collision/explosion (like our Moon formed after merge of pre-Earth and Theia), or
b) directly captured (like moon Triton was captured by planet Neptune).
They are unlikely to be formed in situ.
2) All planets in {1,n=1..5}o and {2,n=1..5}o orbits are possibly originated from
a) in situ (with high possibility, like Earth, Venus, etc.).
b) directly captured (like moon Triton was captured by planet Neptune).
They are not come from the ejected mass from pre-Suns collision.

IV-d. Kepler-11

Table 7. Using {N,n} QM structure to study the Kepler-11 planetary system.

	mass	orbit-r	orbit-v	n=sqrt(r/r1)						n=sqrt(r/r1)		n=sqrt(r/r1)		
	kg	m	m/s											
r1 scsale up/down				1	1/4	1/9	1/16	1/25	1/36	1		0.25	n/6=	
r1=				7.41E+08	1.85E+08	8.23E+07	4.63E+07	2.96E+07	2.06E+07	7.41E+08		1.85E+08		
Kep-11	1.91E+30	7.41E+08		1.00	2.00	3.00	4.00	5.00	6.00	1.00	{0,1}	2.00		
Kep-11b	1.13E+25	1.356E+10	9.57E+04	4.28	8.56	12.83	17.11	21.39	25.67	4.28	{0,4}	8.56	1.43	
Kep-11c	1.73E+25	1.594E+10	8.92E+04	4.64	9.28	13.92	18.55	23.19	27.83	4.64	{0,5}	9.28	1.55	
Kep-11d	4.36E+25	2.31E+10	7.41E+04	5.58	11.17	16.75	22.33	27.92	33.50	5.58	{0,6}	11.17	1.86	
Kep-11e	4.78E+25	2.906E+10	6.60E+04	6.26	12.52	18.79	25.05	31.31	37.57	6.26	{0,7}	12.52	2.09	{1,2}
Kep-11f	1.19E+25	3.725E+10	5.80E+04	7.09	14.18	21.27	28.36	35.45	42.54	7.09	{0,7}	14.18	2.36	
Kep-11g	1.49E+26	6.943E+10	4.27E+04	9.68	19.36	29.04	38.72	48.40	58.08	9.68	{0,9}	19.36	3.23	{1,3}

According to wiki "Kepler-11", Kepler-11 is a G-type star. Distance (to Earth) = 1700 lys. Body-r = 1.065× of Sun's. Mass = 0.961× of Sun's. Rotation= (unknown) days. Age=8.5 billion years old. T = 5663K. Six planets have been detected.

Result and discussion (of Table 7):
1) Name Kepler-11's {N,n} QM structure as Kep11{N,n}. No obvious {N,n//pfactor} can be found for Kepler-11 planetary system.

2) Kepler11 has 0.96× of Sun's mass and 1.06× of Sun's r, so I assume that it has the same {N,n//6} QM system as our Solar QM {N,n//6} structure. Similar as that Kepler90, the simplest possible explanation for Kepler11 is: It was formed from hundreds of small pre-Suns (with Jupiter size) crashed with each other one by one, lost all of their original small planetary systems. Only six (or less) of these small (Jupiter-sized) pre-Suns, instead of crash into the big pre-Sun, were captured by the big pre-Sun at different stage. So today Kepler11's six planets have strange (random) orbits because they were captured at different stage of pre-Sun forming with different r_1.

IV-e. 55-Cancri-A

Table 8. Using {N,n} QM structure to study the 55-Cancri-A planetary system.

	mass	orbit-r	orbit-v	n=sqrt(r/r1)						n=sqrt(r/r1)		n=sqrt(r/r1)	
	kg	m	m/s										
r1 scsale up/down				1	1/4	1/9	1/16	1/25	1/36	1		0.25	
r1=				6.68E+08	1.67E+08	7.42E+07	4.17E+07	2.67E+07	1.86E+07	6.68E+08		1.67E+08	
55CancriA	1.91E+30	6.68E+08		1.0	2.0	3.0	4.0	5.0	6.0	1.0	{0,1}	2.0	{0,2}
55CancriAe	5.15E+25	2.324E+09	2.30E+05	1.9	3.7	5.6	7.5	9.3	11.2	1.9	{0,2}	3.7	{0,4}
55CancriAb	1.57E+27	1.711E+10	8.49E+04	5.1	10.1	15.2	20.2	25.3	30.4	5.1	{0,5}	10.1	{0,10}
55CancriAc	3.25E+26	3.58E+10	5.87E+04	7.3	14.6	22.0	29.3	36.6	43.9	7.3	{0,7}	14.6	{2,1//6}
55CancriAf	2.95E+26	1.164E+11	3.26E+04	13.2	26.4	39.6	52.8	66.0	79.2	13.2	{1,2//6	26.4	{1,4//6}
55CancriAd	7.26E+27	8.553E+11	1.20E+04	35.8	71.6	107.4	143.1	178.9	214.7	35.8	{1,6//6	71.6	{2,2//6}
55CancriB	2.59E+29	1.587E+14		487.4	974.9	1462.3	1949.8	2437.2	2924.6	487.4	{3,2.3/	974.9	{3,4.5//6}

According to wiki "55 Cancri", 55 Cancri is a binary star with a G-type star (55 Cancri A) and a smaller red dwarf (55 Cancri B). 55Cancri-A distance (to Earth) =41 lys. Body-r =0.96× of Sun's. Mass = 0.96× of Sun's. Rotation= 42.2 days. Age =7.4 to 8.7 billion years old, T=5165K. Six planets (including 55 Cancri B) have been detected.

Result and discussion (of Table 8):
1) Name 55 Cancri A planetary system's {N,n} QM structure as Can{N,n}. No obvious {N,n//pfactor} can be found for 55-Cancri planetary system.

2) Since 55-Cancri-A has 0.96× of Sun's mass and r, I assume that it has the same {N,n//6} QM system as our Solar QM {N,n//6} structure. Similar as that Kepler11, the simplest possible explanation for 55-Cancri-A is: It was formed from hundreds of small pre-Suns (with Jupiter size) crashed with each other one by one, lost all of their original small planetary systems. Only six (or less) of these small (Jupiter-sized) pre-Suns, instead of crash into the big pre-Sun, were captured by the big pre-Sun at different stage. So today 55-Cancri-A's six planets have strange (random) orbits because they were captured at different stage of pre-Sun forming with different r_1 . The only difference from Kepler11 is that the farthest planet is too big to be a planet, it is a red dwarf.

3) The {N,n} analysis of 55 Cancri binary star give us a chance to peek into one (probably the most often happened) star evolution process: In a local region of a vast nebula, hundreds of tiny seeds (made from the debris of previous supernova explosion) grew into hundreds of Jupiter-sized celestial bodies, Then the increased G-force between each other (due to increased mass) caused them merge with each other, forming larger and larger (but lesser and lesser in number) of celestial bodies. To the end, only two large pre-Suns (or stars) were left in the local region. Then they crashed into each other and formed a single star. If these two pre-Suns hit head-to-head, then all mass ejected out from the crash/explosion fell back as it lack of orbiting kinetic energy. All previous small planetary systems were destroyed by this last catastrophic crash/explosion, so that the newly formed star has (almost) no planets around it. If not head-to-head, then some ejected mass may form small planets in orbits of {0,n=1..5}o afterward. I name this process of a binary-star crash as the last step of forming a new star as "binary-star crash effect". I believe all (bare) stars without obvious planetary systems are the result of the "binary-star crash effect". If these two stars have good enough kinetic energy to orbit each other, then they will stay long time as binary star before crash, or even stay forever.

V. A hypothesis that our Solar {N,n//6} QM structure reflects the true G-force (and F4-degenerated-force) formed QM in our universe

In 1994, it was predicted that comet Shoemaker–Levy 9 (total 21 fragments) was going to hit Jupiter. I followed the news for months until the crash was done. It is reasonable to think that inside a nebula (which is debris of supernova explosion), there must be many fragments that are too big to be called fragments. For many years, astronomers have proposed that there are Jupiter-sized orphan planets not orbiting a star, but wandering around in the out space. In early 2000's I started to hear about the discovery of supermasive black holes, and the arguments that whether they serve as seeds or they are the products in galaxy forming. In my post-doctor research (on protein engineering, during 1995-1997), I had many chances to grow protein crystals out of single seed for x-ray structural determination.

So just like that I believe all galaxies are formed around the seeds of supermasive black holes, I believe that all stars are formed by using the relative large (tens or hundreds of kilometers-sized, or even Jupiter-sized) celestial bodies as seed. In our universe, there are some planet-sized celestial bodies (named as orphan planet) wandering around. There are many many more kilometer-sized celestial bodies (may or may not grouped like a comet) wandering around. For these comets, we can further classify them as non-nucleus comet (the mass of nucleus < 10% of total mass of comet), nucleus-comet (the mass of nucleus ≥ 50% of total mass of comet). We can (reasonable) guess that in our universe, the seeds ratio between orphan-planet to nucleus-comet, to non-nucleus comet is about 1:10:100. I believe that most stars are formed with these 3 classes of seeds run into (and grew in) the nebula. If the star has no significant self-spin, then this star's seeds most likely come from its own nebula. If the star has a strong self-spin, then this star's seeds most likely come from an outside wandering orphan planet (or comet) that run into the nebula.

Here I hypothesis that our solar system was formed by a wandering Jupiter-sized celestial body (named as orphan Jupiter, or even a dwarf star) that ran into (and captured by) a nebula. It was a medium sized nebula with mass ≥ 2000× of Jupiter's mass, moving in a circular orbit around the center of Milky Way just like our current Sun. The wandering orphan Jupiter flew into this nebula, and the perpendicular distance between the mass center of nebula and the straight-line trajectory of the flying-in orphan Jupiter generated the angular momentum of our current Solar system. The flying-in direction determined a ~62° between our solar system's spin-plan relative to Milky Way's spin plan. The nebula's momentum (or the angular momentum around the center of Milky Way) was inherited by the (eventually formed) Solar system. The flew-in orphan Jupiter quickly spiral-in and superpositioned to the mass center of nebula. On the way it flying-in, it also generated a proto-Solar system's spin reference frame with $\omega_{n\text{-spin}} = \omega_{1\text{-spin}}$ /n^x with x≈3 (see paper SunQM-3s1). After that, the nebula's mass center formed a well defined single-point centered G-force field with a (close to) spherical shape, and with the effective G-force reached up to r of {6,1}. Then all mass inside {6,1} spherical space quantum collapsed to form the current Solar system with size of {5,1}, and all mass outside the {6,1} spherical space was blown away by the inter-stellar wind.

Because of Solar system was developed completely around this orphan Jupiter, which means it was developed under a well defined single-point-centered G-force field, it had a most precise {N,n} QM structure developed, with multiple N super-shell quantum collapse, and each collapse would leave ≤ 1% mass in the original super-shell to form planet/belt. So our Sun has the known planet system up to {2,5}o orbit (probably even up to {3,5}o orbits), and a well defined {N,n} QM structure up to {5,1}. This is like that under a perfect condition, I can grow a large size protein crystal out of a single seed, then the x-ray diffraction can (easily) provide the complete information of protein structure. However, if I use a protein crystal grown from the mixed multi-seeds, then the x-ray diffraction will only give the distorted and confused information. Therefore, our Solar {N,n//6} QM structure reflects the (nearly) perfect G-force (and F4-degenerated-force) formed QM in our universe ! This is the foundation that we can expand Solar {N,n//6} QM structure down to {-25,1} string, and meanwhile up to {15,1} universe, or even to {25,1} universe (if the space is still linear at extreme large or small ends). I guess that there are ≤ 1% of stars in the universe belong to this category.

For most (> 90%) of stars, I believe that they were formed by a group of wandering seeds (either pre-existed in or) run into a nebula. Each of these seeds collected the hydrogen gas matter in the nebula and grew into Jupiter sized celestial body (with their own small planetary system). Without a single-point centered G-force field, this group of Jupiter-sized celestial bodies could not form a single central point G-force orbits, so it become a true N-body movement around a reduced mass center, Then all these Jupiter-sized celestial bodies start to merge with each other because as they were growing, the G-force between them became too strong. Then after the binary-star crash effect, they became the bared stars without the obvious planetary system (guessed as ~80%). Or the star forming process stopped (or slowed down) just before the binary star crash, so they become a binary star (guessed as ~10%).

For HD 10180 kind of stars, they have the effective {N,n} QM structure with planet orbits up to {1,4}o. So I believe that in its original (comet) seed structure, the comet head (nucleus) was > 50% of total comet mass and it formed its own planetary system up to {1,n=1..5}o. After the final merge/explosion, it still retained part of the initial {N,n} QM structure at r > r of {1,1}. For Kepler-90, Kepler-11, TRAPPIST-1 kind of stars, they have the effective {N,n} QM structure with planet orbits ≤ {0,12}. So I believe that in its original (comet) seed structure, the comet head (nucleus) was < 10% of total comet mass and it formed its own small planetary system up to {0,n=1..5}o. During the final merge stage, hundreds of Jupiter-sized pre-Suns merged one-by-one (so there was no binary star crash effect!) to a major growing pre-Sun to form a final single star. All the original small planetary systems were destroyed during merge. A few planet-sized pre-Suns (instead of being merged) were captured by a major growing pre-Sun at the different stage of merging, formed today's planets with irregular (or random) {N,n} orbits. I guess that there are ~10% of stars belong to this category.

VI. More discussions

There is another possible reason for why many stars have no obvious planetary system, it is because these stars lack of enough self-spin angular momentum. In paper SunQM-3s1, the QM calculation shows that spin-frame does decrease the nLL orbital energy (in absolute value) than that of the non-spin frame (besides nLL has the lowest orbital energy among all nlm states). Without strong spin, the star will not be able to produce a strong spin-frame in the nearby space, so that the planets will not be stabilized by moving its orbit into x-y plan (perpendicular to spin axis), So it will not grow to a big stable planetary system. I believe the same thing happens to galaxy too. If a galaxy's supermassive black hole does not have a strong spin, the whole galaxy will not disk-lyze and cannot grow big. It can only be round-shape and small in size.

Similar as that our Sun is a "perfect" star (in a way that it started from a single seed and formed through a series of {N,n} QM collapse governed by a single point centered G-force, and it is in the middle of its 10 billion years stable period), Andromeda Galaxy (not our Milky way) is a "perfect" galaxy, in the way that it has the galaxies averaged mass, it has a strong spin so that it forms a "perfect" disk, and mostly it has a (matured) {2,1} sized SMBH which has finished rapid growth phase. Our Milky way lack of "perfectness" due to it has small ({1,1}) size of SMBH, it has Fermi bubbles and jets, so it is still pre-mature and growing.

Conclusion

1) Solar {N,n//6} QM structure analysis has been applied from string to universe, the size of quark, proton, hydrogen atom, galaxies, Virgo Supercluster match to {-17,1}, {-15,1}, {-12,1}, {8,1}, and {10,1} respectively. {N,1} states at N=0, ±5, ±10, ±10, ±15, … are proposed to be the super-super stable QM structures.

2) The size of elementary particles has been estimated by using {N,n} QM structure analysis.

3) Comparing to other star-planet systems, our Solar system has a nearly perfect {N,n} QM structure. Therefore it reflects the true G-force (and F4-degenerated-force) formed QM in our universe.

References

[1] A series of my papers that to be published (together with current paper):
SunQM-1: Quantum mechanics of the Solar system in a {N,n//6} QM structure.
SunQM-1s1: The dynamics of the quantum collapse (and quantum expansion) of Solar QM {N,n} structure.
SunQM-1s2: Comparing to other star-planet systems, our Solar system has a nearly perfect {N,n//6} QM structure.
SunQM-1s3: Applying {N,n} QM structure analysis to planets using exterior and interior {N,n} QM.
SunQM-2: Expanding QM from micro-world to macro-world: general Planck constant, H-C unit, H-quasi-constant, and the meaning of QM.
SunQM-3: Solving Schrodinger equation for Solar quantum mechanics {N,n} structure.
SunQM-3s1: Using 1st order spin-perturbation to solve Schrodinger equation for nLL effect and pre-Sun ball's disk-lyzation.
SunQM-3s2: Using {N,n} QM model to calculate out the snapshot pictures of a gradually disk-lyzing pre-Sun ball.
SunQM-3s3: Using QM calculation to explain the atmosphere band pattern on Jupiter (and Earth, Saturn, Sun)'s surface.
SunQM-3s6: Predict radial mass density distribution for Earth, planets, and Sun based on {N,n} QM probability distribution.
SunQM-5: C-QM (a new version of QM based on interior {N,n}, multiplier n', |R(n,l)|^2 |Y(l,m)|^2 guided mass occupancy, and RF) and its application from string to universe.
SunQM-5s1: White dwarf, neutron star, and black hole re-analyzed by using C-QM.

[2] The citation of wiki "Solar core" means it is obtained from the Wikipedia online searching for "Solar core". Its website address is: https://en.wikipedia.org/wiki/Solar_core. This website address can be generalized for all other searching items.

[3] (https://www.theguardian.com/science/life-and-physics/2016/apr/07/how-big-is-a-quark),

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[4] Major QM books, data sources, software I used for this study are:
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