SunQM-8: {N,n} QM For the Condensed Matter Structure and/or the Bio-QM Structure (That Formed Under Either the Residue E-Force or the Residue G-Force)

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Abstract

In the past 10 years (since 2016), I discovered that not only the Solar system, but also the whole universe (from the Virgo Super Cluster down to a quark) can be described by a brand new {N,n//6} quantum mechanics. The {N,n//q} QM structures of the Solar planets (Jupiter, Saturn, Neptune, Earth, etc.) further showed that, while the gravitational force strength decreasing (by mass decreasing), the q values also decreased from 6 to 5, 4, 3, and 2. In the current paper, I extended the {N,n//q} QM description to the condensed matter structure and the bio-structure (both of them governed by either the residue E-force, or the residue G-force). 1) I used a one-dimensional {N,n//q} QM with $1 < q < 2$ to describe the condensed matter structure in a 1D-space, and then used a set of one-dimensional {N,n//q} QM (with a set of variable q(s), $1 < q < 2$, and a set of anisotropic but concentric r_1(s)) to describe the condensed matter structure in a 3D space. 2) Furthermore, I used the {N,n//q} QM to describe a bio-structure (e.g., a human body) with $1 < q < 2$, and with a set of anisotropic and un-concentric r_1(s). 3) The originally isotropic distributed force-line (from a point-centered E-force), is redistributed anisotropic (in a residue E-force), and the density is greatly increased in the direction of the residue E-force's exertion direction (in 1D-space), and thus greatly increased the force strength in that 1D direction (out of the rθφ-3D space), and formed a strong "σ-bond" in that 1D direction. 4) The same explanation for the residue G-force explained the quasi "σ-bond" in the two arms of a galaxy, and thus contributed to the "Dark matter" effect. Thus, the matter in the two arms of a galaxy can also be treated as the condensed matter (that governed by the residue G-force) in a spiral-line 1D-space (along this galaxy arm's 1D-space). Similarly, the multi-arm structure (that extended from any one node of the cosmic web) can also be treated as the condensed matter structure that governed by the residue G-force in a multiple (curved-line) 1D-space. 5) If the (newly defined) "primary force strength density" equals to a constant value for all three primary forces (G-, E-, and S-), then we may can estimate the size of our universe.

Key Words: Quantum mechanics, {N,n} QM, Condensed Matter, Bio-QM Structure.

Introduction

In August 2016, I discovered that the Solar system can be described by a brand new {N,n//6} quantum mechanical structure [1]. Based on that result, (during the past 10 years of the closed-door research), I further (independently) developed a {N,n//q} QM theory, and showed that not only the formation of Solar system [1] ~ [16], but also the formation of the whole universe [17] ~ [25], may can be described by the {N,n//6} QM. (Note: As an independent scientist, some of my research work may belong to a citizen-scientist-leveled work). As part of the {N,n} QM development, I (independently) designed and developed a brand new {N,n} QM field theory (for any point-centered field, like a mass field, a force field, or an energy field, etc.) [23] ~ [24], [26] ~ [34], [37] ~[38]. The foundation of this theory includes: the four fundamental forces (Gravity, Electromagnetic, Strong, Weak, abbreviated as G-, EM-, S-, W-forces) have been re-classified into three pairs of force (E/RFe-force, G/RFg-force; S/RFs-force, see SunQM-6); all point-centered fields (including the mass field, the force field, and the energy field) can be represented by the Schrodinger equation/solution (in form of non-Born probability as well as in form of a 3D spherical wave packet, see SunQM-6s4); the non-Born probability description (that equals to the re-explanation of the Born probability density) as the collection of all elliptical orbital tracks (or, the Born probability density map's contour lines can be re-explained as the trajectory of a motion electron, see SunQM-6s2's Fig-2), the spherical 3D wave packet description (with each shell's diameter equivalent to about one wavelength of the spherical matter wave), the dis-entanglement of the outmost shell of the 3D wave packet (i.e., the "general decaying" process, see SunQM-6s1, -6s2, -6s3), the "|nL0> elliptical/parabolic/hyperbolic orbital transition model" (see SunQM-6s2, -6s3), the seamless transformation between a quantum process and a continues process through moving the r_1 inward (see SunQM-5s2), the trick that using the high-frequency n' quantum number to pin-point any small region in the {N,n} QM field (see SunQM-3s11, SunQM-6s1, etc.), a new type of 3-body motion as the "face-to-face plus face-opposite-face two-level orbital motion" (see SunQM-6s10), etc. So, the {N,n} QM is constituted with two parts: the Bohr-QM part (with {N,n//q} structure added), and the Schrodinger-equation-QM part (with RF, and {N,n} QM field theory added). Furthermore, by using {N,n} QM and the r'rθφ-4D space, I may be able to explain the possible origins of the lightspeed and its constancy (see SunQM-7s1 [35]), the $E = mc^2$, the length contraction in the special relativity, and the radial contraction in the general relativity. I even successfully fused the General Relativity's radial contraction calculation into the non-linear {N,n//q} QM structure's calculation at a black hole's surface (see SunQM-7s2 [36]). In the current paper, I tried to extend the Bohr-formula based {N,n//q} QM structural description from the point-centered (force/mass) field to the condensed matter structure (like a crystal lattice), and even to the bio-QM structure (like a human body).

Note: **QM** means Quantum Mechanics, **{N,n} QM** equals to **{N,n//q} QM**. Note: The best reading sequence for the (38 posted) SunQM series research papers is: SunQM-1, 1s1, 1s2, 1s3, 2, 3, 3s1, 3s2, 3s6, 3s7, 3s8, 3s3, 3s9, 3s4, 3s10, 3s11, 4, 4s1, 4s2, 5, 5s1, 5s2, 7, 6, 6s1, 6s2, 6s3, 6s4, 6s5, 6s6, 6s7, 6s8, 6s10, 6s10, 6s11, 7s1, 7s2, and 8. Note: for all SunQM series papers, reader should check papers of SunQM-9s1 and SunQM-9s2 for the most recent updates and corrections. Note: Microsoft Excel's number format is often used in this paper, for example: x^2 = x^2, 3.4E+12 = $3.4*10^{12}$ = 3.4×10^{12}, 5.6E-9 = $5.6*10^{-9}$.

I. {N,n//q} QM for the condensed matter structures

Here I **define the "Condensed Matter {N,n//q} QM structure" as those Condensed Matter structures that governed by either the residue E-force (like the chemical bond, hydrogen-bond, Van Der Waals bond, etc.) or the residue G-force (like that in the galaxy's arm, or in the cosmic-web filaments)**, but not by the primary E-force (like an atom's electron shell structure) and/or the primary G-force (like a Sun's structure). For easy comparison, I also defined the matter in the structure that is formed under the primary G-force (like a Sun's structure) and/or the primary E-force (like an atom's electron shell structure) as the "**Newtonian Matter**". Alternatively, the Newtonian Matter has the structure governed by the $F \propto 1/r^2$ force, including either the primary G-force, or the primary E-force. Note: A matter can be either a pure Newtonian Matter, or a pure Condensed Matter, or simultaneously both a Newtonian Matter and Condensed Matter (see more explanations below).

In SunQM-1s3's section-XI, I wrote: "*we can see the limitation of {N,n} QM is that it is suitable only for the primary forces, or single point open force (like G-force, or EM-force as shown in paper SunQM-2) formed structure, it is not suitable for the secondary force (like chemical bond force, van der Waals force, hydrogen-bond force, etc) formed solid (or condensed matter) structure. So {N,n} QM is not suitable for our daily-life world's meter-sized objects*". After many more years of trying, now I believed that I may have developed out one way to use {N,n//q} QM to describe the condensed matter that governed by either the residue E-force, or by the residue G-force.

In SunQM-5, I pointed out: In {N,n} QM, the "*analysis showed us several true examples that the quantum number q can be in values of 7 (the {N,n//7} QM structure of nuclides at high Z#), 6 (the standard {N,n//6} QM structure from N = -17* *to N = 10), 5 (Jupiter's internal and surface p{N,n//5} QM structure), 4 (equivalent to {N,n//2} QM naturally), 3 (Saturn's internal and outer ring p{N,n//3} QM structure, and Jupiter's outer ring p{N,n//3} QM structure), 2 (the initial p{N,n//2} QM structure for all original planets, the current Neptune's p{N,n//2} QM structure), ... So far, we have not seen any obstacle for q quantum number to take the even higher values of 8, 9, etc., or the even lower values of 2*½*½= 1/2, or even 2*½*½* ½=1/4, etc.*". The shifting of q = 6 to q = 7 (at the high Z#) may be true for both the atomic electron configuration and the nuclear proton configuration. In SunQM-7s2's section-IV eq-25, I hypothesized that outside of a Sun-massed BH, the q quantum number for the {N,n//q} QM structure is modulated by the Einstein-Lorentz transformation factor to be the new $q' = \frac{q}{\sqrt{1-\frac{v_r^2}{c^2}}}$, and thus, the q' → ∞ at the surface of a BH.

From above results, I concluded that for a point-centered primary E-force (and/or primary G-force) formed {N,n//q} QM structure, it has the base q = 6, with maximum q → ∞, and minimum q → 2. Then, I hypothesized that, **for a residue E-force (and/or residue G-force) formed Condensed Matter {N,n//q} QM structure, the q value should be 1 < q < 2**.

I-a. {N,n//q} QM description for the 1D crystal lattice structure, with 1 < q < 2, and using {N,n//2} kind of calculation

Columns 1 ~ 3 of the Table 1 showed a standard Bohr-QM calculation, with n (= 1, 2, 3, … 10), r_1 = 2, and $r_n = r_1 n^2$ (= 2, 8, 18, … 200). In Figure 1a, I used a 1D array structure (with the constant distance in between, i.e., Δr = 2) to illustrate a 1D condensed matter structure. Then, in the column 1 and column 4 of Table 1, this 1D array was expressed as n = 0, 1, 2, 3, … 10, and, r_n = 0, 2, 4, 6, … 20. The task is: I need to use this 1D array (n = 0, 1, 2, 3, … , r_n = 0, 2, 4, 6, …) and Bohr formula $r_n = r_1 n^2$ (or, $r_n = r_1(n")^2$ kind of formula, where n" can be the non-integer values) to describe this 1D condensed matter in the format of {N,n//q} QM.

Columns 5 ~ 7 of the Table 1 showed a close-to-Bohr-QM calculation, with n (= 1, 2, 3, … 10), r_1 ≡ 2, n" = $\sqrt{n}$, and $r_n = r_1(n")^2$. Although it gave the correct result of r_n = 2, 4, 6, … 20, the variable q values do not match the {N,n//q} QM format with 1 < q < 2. (Note: If we allowed to modify the Bohr-formula $r_n = r_1 n^2$, then $r_n = r_1(n")^2 = r_1 n$ will be the simpler format. Note: In the {N,n//q} QM, the standard Bohr-QM can be written as {0,n//q}, with N ≡ 0 (meaning a single N super shell)). So, this is not the right format we are looking for.

Columns 12 ~ 15 of the Table 1 showed a standard {N,n//2} $r_n = r_1 n^2$ calculation with q = 2 fixed, the r_{n-1} (in column 15) become the new r_1 (in column 13) for the next $r_n = r_1 n^2$ calculation (in column 15), so it become, $r_n = r_{n-1} q^2 = (r_{n-2} q^2) q^2 = \ldots = r_1 q^{2(n-1)}$.

Columns 8 ~ 11 of the Table 1 showed a {N,n//q} = {N,n//2} kind of format description (with 1 < q < 2) for the same 1D array structure (that shown in Figure 1a). Then, how to calculate the $r_{n"} = r_1(n")^2$ here for 1 < q < 2? Here I defined that the calculation follows the {N,n//2} kind, but with the true q value (1 < q < 2) for each n. That is, the r_{n-1} (in column 11) become the new r_1 (in column 9) for the next $r_n = r_1 n^2$ calculation (in column 11), so it become, $r_n = r_{n-1}(q_{n-1})^2 = (r_{n-2}(q_{n-2})^2)(q_{n-1})^2 = \ldots$, where the variable $q_n = n" = \sqrt{\frac{n}{n-1}}$. For example, $r_1 = 2$, $r_2 = r_1 \times \left(\sqrt{\frac{2}{1}}\right)^2 = 4$, $r_3 = r_2 \times \left(\sqrt{\frac{3}{2}}\right)^2 = 4 \times \frac{3}{2} = 6$, $r_4 = r_3 \times \left(\sqrt{\frac{4}{3}}\right)^2 = 6 \times \frac{4}{3} = 8$, … (see column11 of Table 1). In this way, I have created a new way to use {N,n//q} QM to describe a 1D crystal lattice shown in Figure 1a.

See appendix A for the other possible (and non-essential) q values in the {N,n//q} QM, (e.g., {N,n//3}, {N,n//6}, etc.), for the condensed matter 1D structures.

Figure 1a. A standard 1D crystal lattice, with n (= 0, 1, 2, 3, …), $r_1 \equiv 2$, and $r_n = r_1 n$ (= 2, 4, 6, …).
Figure 1b. A primitive cubic unit cell in a 3D crystal lattice with a = b = c = 1, and α = β = γ = 90°.

Table 1. Using a 1D array (r_n = 0, 2, 4, 6, …) and Bohr formula $r_n = r_1 n^2$ to describe the 1D "Condensed Matter {N,n//q} QM structure" with {N,n//2} kind of format.

traditional QM's n			1D array's	**{N≡0,n//q}, with q variable**			**{N,n//q}={N,n//2} kind, with 1 < q < 2, q variable**				standard {N,n//2}			
n=	r_1=	$r_n = r_1$* n^2	r_n=	r_1=	n"=sqrt(n) =q	$r_n = r_1$* (n")^2		r_1=	q=n"=sqrt(n/(n-1))	$r_n = r_{n-1}$*(n")^2		r_1=	q=n"=2	$r_n = r_{n-1}$*(n")^2
			0											
1	2	2	2	2	sqrt(1) = 1	2	{0,1//q}	2	sqrt(1/1) = 1	2	{0,1//2}	2	1	2
2	2	8	4	2	sqrt(2) = 1.414[illegible]	4	{0,q//q}={1,1//q}	2	sqrt(2/1) = 1.41421	4	{0,2//2}={1,1//2}	2	2	8
3	2	18	6	2	sqrt(3) = 1.732[illegible]	6	{1,q//q}={2,1//q}	4	sqrt(3/2) = 1.2247[illegible]	6	{1,2//2}={2,1//2}	8	2	32
4	2	32	8	2	sqrt(4) = 2	8	{2,q//q}={3,1//q}	6	sqrt(4/3) = 1.1547[illegible]	8	{2,2//2}={3,1//2}	32	2	128
5	2	50	10	2	sqrt(5) = 2.236[illegible]	10	{3,q//q}={4,1//q}	8	sqrt(5/4) = 1.1180[illegible]	10	{3,2//2}={4,1//2}	128	2	512
6	2	72	12	2	sqrt(6) = 2.449[illegible]	12	{4,q//q}={5,1//q}	10	sqrt(6/5) = 1.0954[illegible]	12	{4,2//2}={5,1//2}	512	2	2048
7	2	98	14	2	sqrt(7) = 2.645[illegible]	14	{5,q//q}={6,1//q}	12	sqrt(7/6) = 1.0801[illegible]	14	{5,2//2}={6,1//2}	2048	2	8192
8	2	128	16	2	sqrt(8) = 2.828[illegible]	16	{6,q//q}={7,1//q}	14	sqrt(8/7) = 1.0690[illegible]	16	{6,2//2}={7,1//2}	8192	2	32768
9	2	162	18	2	sqrt(9) = 3	18	{7,q//q}={8,1//q}	16	sqrt(9/8) = 1.0606[illegible]	18	{7,2//2}={8,1//2}	32768	2	131072
10	2	200	20	2	sqrt(10) = 3.16[illegible]	20	{8,q//q}={9,1//q}	18	sqrt(10/9) = 1.054[illegible]	20	{8,2//2}={9,1//2}	131072	2	524288
…		…												
infinity		infinity	infinity		→ ∞	→ ∞		→ ∞	→ 1	→ ∞		→ ∞	fixed	→ ∞

I-b. {N,n//q} QM description for a 3D crystal lattice: using multiple 1D crystal lattice's {N,n//q} QM to describe

Here I defined that, the {N,n//q} QM structure of a 3D crystal lattice (with one lattice point at [0,0,0] of a xyz-coordinate, or in a rθφ-3D space) can be described by a set of standard 1D crystal lattices (that described in the section I-a) that radiated from a single point [0,0,0], with the r_1 of each 1D {N,n//q} QM equals to the distance between [0,0,0] and each closest lattice points [x,y,z] (in the x > 0 space of the xyz-3D space), and with the directions from [0,0,0] to the [x,y,z] of these closest lattice points. Once a complete set of 1D {N,n//q} QM with $r_1 = \sqrt{x^2 + y^2 + z^2}$ to the all closest lattice points [x,y,z] are constituted, then this set of 1D {N,n//q} QM is a complete 3D {N,n//q} QM description for this 3D crystal lattice.

For example, Figure 2b showed a xy-2D space (with z ≡ 0) illustration for a crystal lattice (4×4 dots)'s exterior {N,n//q} structure (that formed by the residue E-force, with $r_1 < r_n$). Here, we need to choose a set of 1D {N,n//q} QM with r_1 = 2, along [0,0,0] to [1,0,0] direction, and [0,0,0] to [0,1,0] direction, to describe. Meanwhile, we need to choose a set of 1D {N,n//q} QM with $r_1 = 2 \times \sqrt{1^2 + 1^2} = 2\sqrt{2}$, along [0,0,0] to [1,1,0] direction, and [0,0,0] to [1,-1,0] direction, to describe. And, a set of 1D {N,n//q} QM with $r_1 = 2 \times \sqrt{2^2 + 1^2}$, along [0,0,0] to [2,1,0], to [1,2,0], … directions; a set of 1D {N,n//q} QM with $r_1 = 2 \times \sqrt{3^2 + 1^2}$, along [0,0,0] to [3,1,0], to [1,3,0], … directions; a set of 1D {N,n//q} QM with $r_1 = 2 \times \sqrt{3^2 + 2^2}$, along [0,0,0] to [3,2,0], to [2,3,0], … directions, to describe. This set of 1D {N,n//q} QM should have given a complete description for a 4×4 dots crystal lattice. (Note: In theory, for an infinitely large-sized crystal lattice, it needs infinitely large numbers of 1D {N,n//q} with infinitely different r_1 to describe. For a real crystal matter with limited size, this number is limited, although it could be very large). Obviously, the for a 3D crystal lattice, the unit cell description (see Figure 1b, with a primitive cubic unit cell a = b = c = 2, and α = β = γ = 90°) is much more superior than the {N,n//q} QM description (that is made of a set of 1D {N,n//q} QM description). (Question for myself: How does this set of 1D {N,n//q} QM relate to the crystal direction, crystal plane, and the reciprocal lattice? [39]).

Figure 2(a, b, and c) showed a (xy-2D space) comparison between the primary-force formed exterior {N,n//2} QM planet structure, a residue-force formed exterior {N,n//q} QM crystal structure, and a residue-force formed Bio-QM exterior {N,n//q} human body structure. Figure 2a (the primary G-force formed {N,n//2} QM) has a single valued r_1 (with $r_1 < r_n$) isotropic to all directions, and with all the r_n (= r_1n^2, or for {N,n//2}, $r_n = 4r_1$) circles concentric to the r_1 circle (in xy-2D plot).

The major differences between a planet's {N,n//2} and a crystal lattice's {N,n//q} (in Figure 2a and Figure 2b) is compared (side-by-side) in the Table 2's column 2 and column 3. For example: While the primary G-force formed planet's exterior {N,n//2} has a single valued isotropic r_1 and a single fixed value of q = 2, the residue E-force formed crystal lattice's exterior {N,n//q} has multi-values anisotropic r_1, each direction has its unique r_1 value (e.g., in the direction of [0,0] to [0,1], $r_1 = 2$; in the direction of [0,0] to [1,1], $r_1 = 2\sqrt{1^2+1^2}$; in the direction of [0,0] to [2,1], $r_1 = 2\sqrt{2^2+1^2}$, …), and a series of variated q values in the range of $1 < q < 2$ (e.g., in the direction of [0,0] to [0,1], from r = 2 to r = 4, $q = \sqrt{2} = 1.414$; from r = 4 to r = 6, $q = \sqrt{3/2} = 1.224$; from r = 6 to r = 8, $q = \sqrt{4/3} = 1.154$, ..., see Table 1's column 10). Again, in comparison with the unit cell description, the crystal lattice's 3D {N,n//q} QM description (that is made of a set of 1D {N,n//q} QM description) is impractical to use.

Note: In Figure 2b and Table 1 columns 8~11's calculation, the anisotropy of 1D {N,n//q} QM in a crystal lattice (that radiated from the [0,0,0] coordinate) has been put into that, the different direction has different r_1 value, so that all directions have the same q value ($1 < q < 2$). That is, the q is isotropic, the r_1 is anisotropic, (and we named it as the "method-1"). Alternatively, we may can change the calculation to be: the q is anisotropic, the r_1 is isotropic (and we named it as the "method-2"). Method-2 is not discussed here, because it is more impractical to be used than that of method-1.

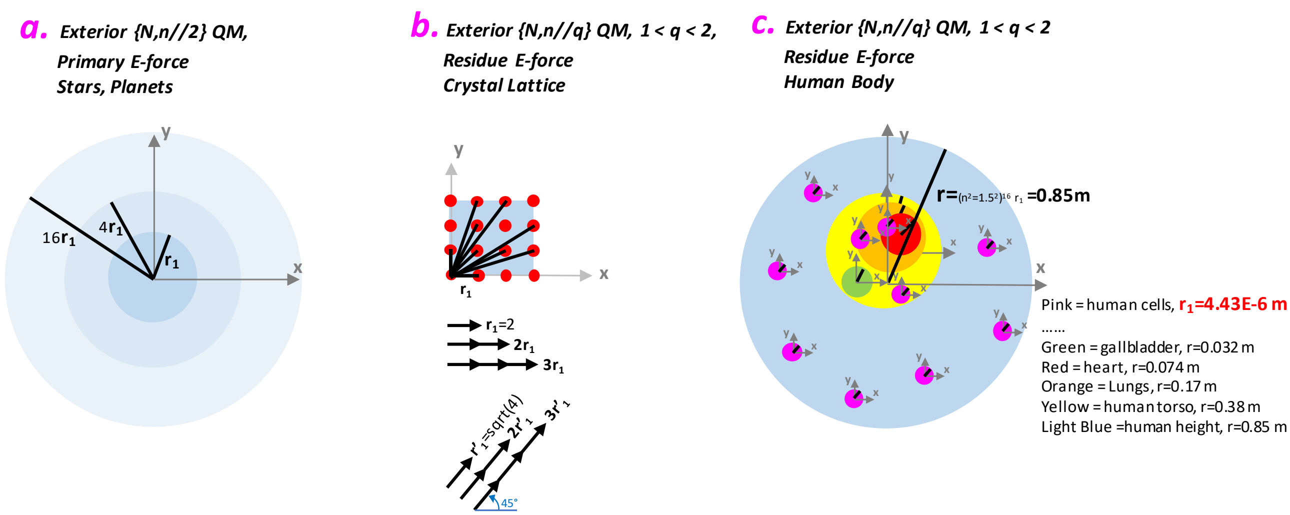


Figure 2a. For a standard {N,n//2} structure. To illustrate a (single-point-centered) primary E-force governed exterior {N,n//2} QM in xy-2D, with an isotropic (single valued) r_1, and with all the r_n (= r_1n^2) circles concentric to the r_1 circle (in xy-2D plot).

Figure 2b. For a crystal lattice (one kind of the condensed matter). To illustrate a (non-single-point-centered) residue E-force governed {N,n//q} QM (with $1 < q < 2$) in a crystal lattice (in xy-2D). It can be described as a group of many 1D {N,n//q} that radiated from a single origin, and each with different $1 < q < 2$ and different r_1, and with all the r_n (= r_1n^2) circles concentric to all the r_1 circles (in xy-2D plot).

Figure 2c. To illustrate a (non-single-point-centered) residue E-force governed exterior {N,n//q} QM (with $1 < q < 2$) for a human body (in xy-2D). It can be described as a group of many exterior 1D {N,n//q}, each with a fixed q value ($1 < q < 2$), and with different origin and r_1, and with all the r_n (= r_1n^2) circles not concentric to each other (in xy-2D plot), see section II.

Table 2. Comparing a planet's {N,n//2} QM to a crystal lattice's {N,n//q} QM, and to a human body's {N,n//q} QM.

	Primary {N,n//2}	**Crystal Lattice {N,n//q}**	**Bio-QM {N,n//q}**
formed under a **primary force,** or a **residue force**	primary E-force, or primary G-force	residue E-force, or residue G-force	residue E-force, or residue G-force
example	star, planet	crystal lattice	human body
r_1=	single center, singel fixed value, isotropic	single center, multi-value, variate, anisotropic	multi-centers, Multi-value, variate, (could be a singel fixed value), anisotropic
concentric of r_1	y	y	n
concentric of r_n to r_1	y	y	n
q= for **exterior {N,n//q}** $r_1 < r_n$	q=2, singel fixed value Figure 2a	1 < q < 2, mutiple, variate values Figure 2b	1 < q < 2, mutiple, variate values Figre 2c used a single fixed q=1.5,
q"= 1/q for **interior {N,n//q}** $r_1 > r_n$	q"= 1/2, singel fixed value Figure 3a	1/2 < q" < 1, mutiple, variate values Figure 3b	1/2 < q" < 1, mutiple, variate values Figure 3c used a single fixed q"= 0.667,
symetry	isotropic point symetry, +r = -r for all 4π directions	anisotropic point symetry, +r = -r for each one direction	none
Single object (star, crystal, human body)	Single star: r_1, isotropic, equals to 1D {N,n} QM, 1D-dimension	Single crystal: r_1, anisotropic, equals to many 1D {N,n} QM, or high-dimension, Hilbert space? Concentric,	Single human body: r_1, anisotropic, equals to many 1D {N,n} QM, or high-dimension, Hilbert space? Unconcentric, many Hilbert spaces?
Many objects (stars, crystals, human bodyies)	Many stars: their r_1 are unconcentric to each other. Multi-1D space?	Many crystals: Multi-high dimension spaces, or multi Hilbert spaces? Unconcentric.	Many human bodies: Two-level high-dimension, or, two-level many Hilbert spaces? Two-level-unconcentric.

II. Bio-QM structure description in {N,n//q} format with 1 < q < 2, and using {N,n//2} kind of calculation

In paper SunQM-5's section-VII, I wrote: "*For the daily-life-world objects, they are made of molecules (with chemical bond), or a collection of molecules like biological cells, or even human body (formed with chemical bond, salt bridge, hydrogen bond, van der Waals bond, etc., all belong to the residue EM-force). Their interior {N,n} QM structures should be analyzed in the same way as that for the water/ice ball. We spend so much effect to study the meter-sized carbon (or H_2O) giant molecule's (or ball's) {N,n} QM, simply because I was a biophysicist. So I interested in human body's {N,n} QM more than the celestial body's {N,n} QM. Unfortunately, the result showed that the chemical bond force expanded the size of an (C-C and C-H composed) mass … so that the (EM- or G-forced) {N,n} QM analysis is not suitable for (meter-sized) human body. Alternatively, does this analysis implies that the {N,n} QM structure is not able to produce any life structure, because {N,n} QM is a too simple physical process, lack of the diversity (that is required for the life structure)?*". Again, after many more years of trying, now I believed that I may have developed out one way to use {N,n//q} QM to describe the bio-living structure (that is also one kind of the condensed matter) that governed by the residue E-force. In the current section, let me use a human body as the example for the explanation.

The prerequisite for the designing of a human body's {N,n//q} structure is: because both crystal structure and human body structure belong to the condensed matter (that is formed under the residue E-force), the {N,n//q} description for a human body should be more or less the same as the 3D {N,n//q} description for a crystal. That means, just like a crystal lattice's 3D {N,n//q} description has 1 < q < 2, a human body's 3D {N,n//q} description may also should have 1 < q < 2.

Figure 3a showed a human body with the Hight ($2r_1$ = 1.70 meters along y-axis), Width ($2r'_1$ = 0.5 meters along x-axis), Depth ($2r''_1$ = 0.18 meters along z-axis). Based on that the crystal lattice's r_1 is anisotropic, we can set that a human body r_1 is also anisotropic (so that along y-axis, x-axis, and z-axis, $r_1 \neq r'_1 \neq r''_1$). Then, a human torso (see Figure 3a's yellow area)'s H×W×D can be 0.76×0.4×0.18 meters, his lung (see Figure 3a's orange area) can be 0.34×0.24×0.10 meters, etc.

However, the anisotropic r_1 ($r_1 \neq r'_1 \neq r''_1$) is too complicated for the initial description of a human body in {N,n//q} format. So, I simplified the anisotropic r_1 ($r_1 \neq r'_1 \neq r''_1$ as shown in Figure 3a) to be an isotropic r_1 ($r_1 = r'_1 = r''_1$ as shown in Figure 3b), and used the Hight = $2 \times r_1$ as the only r_1 for all xyz-3D directions. This is why all human organs (in Figure 3a) are represented by the spheres in Figure 3b. So, in both section II-a and section II-b, I used the simplified isotropic r_1 to build the {N,n//q} QM format description for a human body.

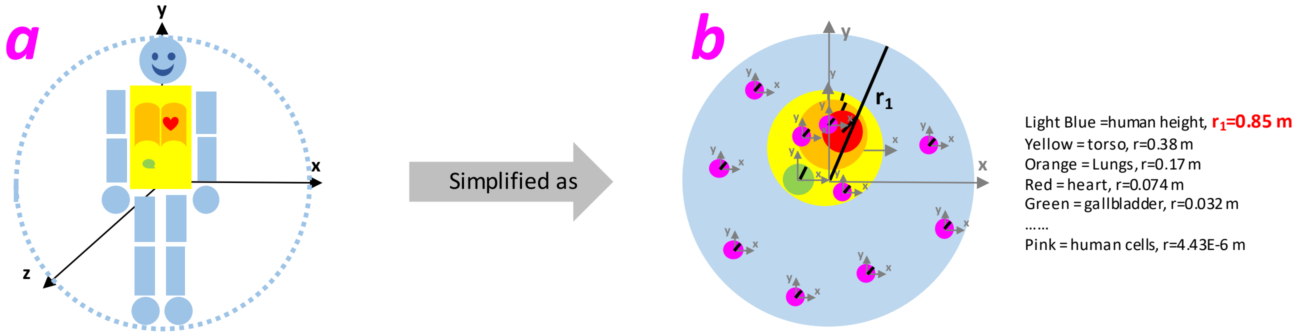


Figure 3a. Illustration of an anisotropic r_1 ($r_1 \neq r'_1 \neq r''_1$ along y-, x-, z-axis) description for a human body in a {N,n//q} QM format.
Figure 3b. Illustration of an isotropic r_1 ($r_1 = r'_1 = r''_1$ along y-, x-, z-axis) description for a human body in an interior {N,n//q} QM format. (Note: the sizes drawn are not on scale).

II-a. Bio-QM structure description using the exterior {N,n//q} format, and using variable q value (with 1 < q < 2), and using {N,n//2} kind of calculation

Then, according to the 3D {N,n//q} description for a crystal lattice (see Table 1's columns 8 ~ 11, and Figure 1), by listing a series of different sized human body and organs, I designed Table 3, and then forced them to follow a kind of {N,n//2} description (i.e., Table 1's columns 8 ~ 11 for a crystal lattice). First, for a crystal lattice's 3D {N,n//q}, the 1 < q < 2 (see Table 1's column 10) is required, and we used {N,n//2} kind of calculation for the calculation of {N,n//q} with 1 < q < 2, i.e., $\mathbf{r_n = r_{n-1} (q_n)^2}$. Therefore, for the human body's {N,n//q} with 1 < q < 2, I also chose it to follow $\mathbf{r_n = r_{n-1} (q_n)^2}$ format. For example, (as shown in Table 3), from a human heart (r = 0.06 meter) to a human lungs (r = 0.15 meter), it can be described by {N,n//q} = {N,n//1.58} as 0.15 = 0.06 *(n'' = q = 1.58)^2; from a human lungs (r = 0.15 meter) to a human torso (r = 0.4 meter), it can be described by {N,n//q} = {N,n//1.63} as 0.4 = 0.15 *(1.63)^2; from a human torso (r = 0.4 meter) to a human height (r = 0.85 meter), it can be described by {N,n//q} = {N,n//1.46} as 0.85 = 0.4 *(1.46)^2, etc. Notice that this is an exterior {N,n//q}, because $r_1 < r_n$. In Figure 2c, I illustrated the above exterior {N,n//q} description for human body in a xy-2D plot.

However, there is a major problem in Table 3: from human cell (r = 6E-6 meter) to a human gallbladder (r = 0.035 meter), its q = n'' = sqrt(0.035/6E-6) = 76.38, much bigger than the 1 < q < 2 (that is required for a condensed matter's exterior {N,n//q}). Obviously, we can solve this problem by adding more sub-structures between the size of human cell and the size of the human gallbladder, for example, a human egg cell (r = 6E-5 meter), a Golgi tendon organ (r = 2.56E-4 meter), a human eye cornea (r = 6.55E-3 meter), a human eye ball (r = 1.47E-2 meter), etc. So, in Table 3, I can add many more (human organ or bio-molecular) sub-structures, (like a human body, a torso, chest, thigh, calf, head, foot, hand, heart, stomach, … bio-cells, … proteins, amino acids, chromosome, DNA, nucleotides, …), and then use many variable q values (but all of them are within the range of $1 < q < 2$) to describe the size difference between these sub-structures in the {N,n//q} format, (see the result in Table 4).

Table 3. To force a list of different sized human organs to follow a kind of {N,n//2} description (that mimicking a crystal lattice's 3D {N,n//q} description).

	exterior {N,n//2}		
	Human Organ sizes		
	r_n = (meter)	n" =sqrt(r_n/r_{n-1})	q =n"
hyman cell nucleus, 10% cell Vol.	2.78E-06		
human cell,d=6 um	6.00E-06	1.47	1.47
human gallbladder, d=7 cm	0.035	76.38	76.38
human heart, d=12 cm	0.06	1.31	1.31
human lungs, d=30 cm	0.15	1.58	1.58
adult human torso, d=0.8 m	0.4	1.63	1.63
adult human height, d=1.7m	0.85	1.46	1.46

II-b. Bio-QM structure description using the interior {N,n//q} format, and using q = 1.5 (i.e., a single fixed q value with 1 < q < 2), and using {N,n//2} kind of calculation

In building Table 4, I made other two major changes (in comparison with that of Table 3). First, I used the **interior {N,n//q} = exterior {N,n//(1/q)}**, start from a human body (height $d = 2r_1 = 1.7$ meter, or, $r_1 = 0.85$ meter), to calculate the down-size (i.e., $r_n < r_1$). Second, instead of using the natural $q = sqrt(r_n/r_1)$ that may have different values for different r_n, now I chose to use a single fixed value q for all different r_n. According to (https://en.wikipedia.org/wiki/Cell_nucleus), "*In eukaryotes the nucleus in many cells typically occupies 10% of the cell volume*". For a spherical volume V = (4/3)πr^3, the 10x larger in volume means 2.2x larger in radius. So, for the exterior {N,n//q} with $1 < q < 2$, it gives $q = n = sqrt(r_n/r_{n-1})$ = sqrt(2.2) ≈ 1.5, (note: this q = 1.5 result fits the $1 < q < 2$ requirement for a condensed matter's exterior {N,n//q}). For the interior {N,n//q} = exterior {N,n//(1/q)}, q" = 1/q = 1/1.5 ≈ 0.667. So, I chose a single fixed value of q" = 0.667 for the human body's exterior {N,n//q"} calculation in Table 4, it fits the $1 < q < 2$ requirement for a condensed matter's exterior {N,n//q}. Thus, in Table 4's Column 3, the interior $\{N,n//q_{=1.5}\}$ = exterior $\{N,n//q"_{=0.667}\}$ calculations were: from human body height (r_1 = 0.85 meter) to human torso, r = 0.85 * (0.667)^2 = 3.78E-1 meter; from human torso (r = 3.78E-1 meter) to human lungs, r = 3.78E-1 *(0.667)^2 = 1.68E-1 meter; from human lungs (r = 1.68E-1 meter) to human heart, r = 1.68E-1 * 0.667^2 = 7.46E-2 meter, etc. Then, for each exterior $\{N,n//q"_{=0.667}\}$ calculated r_n (in column 3), in column 4, I assigned one (or several) human organ(s) and/or bio-molecules that has the size closely matched to that r_n value. (Note: Due to my limited bio-knowledge, some r_n are still left un-assigned in column 4).

Then, part of the result in Table 4 was illustrated in Figure 4c. In Figure 4c, a human body (at 1.70 meters tall) is represented by a (light blue colored) circle with r_1 = 0.85 meter in xy-2D. Inside it, the torso of this human body is represented by a (yellow colored) circle with r_2 = 0.378 meter in xy-2D, the lungs of this human body is represented by a (orange colored) circle with r_3 = 0.168 meter, the heart of this human body is represented by a (red colored) circle with r_4 = 7.46E-2 meter, the gallbladder of this human body is represented by a (green colored) circle with r_5 = 3.32E-2 meter, …, and all (averaged) human cells are represented by a (pink colored) circle with r_n = 4.43E-6 meter.

Figure 4(a, b, and c) showed a (xy-2D space) comparison between the primary-force formed interior {N,n//2} QM planet structure, a residue-force formed interior {N,n//q} QM crystal structure, and a residue-force formed Bio-QM interior {N,n//q} human body structure. Similar as that in Figure 2a, Figure 4a has a single valued r_1 (with $r_1 > r_n$) isotropic to all directions, and with all the r_n (= (1/4)r_1, or, = (1/16)r_1) circles concentric to the r_1 circle (in xy-2D plot). Figure 4b showed a xy-2D space illustration for a crystal lattice (4×4 dots, similar as that of Figure 2b)'s interior {N,n//q} structure (that formed by the residue E-force, with $r_1 > r_n$). Figure 4c showed a xy-2D space illustration for a human body (similar as that of Figure 2c)'s interior {N,n//q} structure (that formed by the residue E-force, with $r_1 > r_n$). The major differences between a crystal lattice's {N,n//q} and a human body's {N,n//q} is compared (side-by-side) in the Table 2's column 3 and column 4. The first and the most important difference (or property) is, while all different r_n 's circles are concentric to r_1 's circle for both the crystal lattice's {N,n//q} (see in Figure 4b) and a planet's {N,n//2} (see in Figure 4a), the human body's {N,n//q} has all the r_n 's circles un-concentric to each other, and un-concentric to r_1 's circle (see in Figure 4c). The second important difference (or property) is, while all different r_n are all accurately calculated for both the crystal lattice's {N,n//q} (see in Figure 4b) and a planet's {N,n//2} (see in Figure 4a), the human body's {N,n//q} has all the r_n are only roughly matched. These two properties made the human body's {N,n//q} description impractical to use, even though it still roughly belongs to a kind of {N,n//q} description. Even so, as a former biophysicist, I am really glad that now I am able to use {N,n//q} QM to describe a human body structure (even it is not much useful practically).

Furthermore, if we add the anisotropic r_1(s) (as shown in Figure 3a, with $r_1 \neq r'_1 \neq r''_1$ along y-, x-, z-axis) into the Figure 4c's un-concentric r_1(s) description, plus for each anisotropic and un-concentric r_1(s) we allow an independent variable q value, then we should have a very accurate (and a very complicated) description for a human body in the {N,n//q} QM format.

Table 4. For a human body's bio-QM structure, using the interior $\{N,n//q_{=1.5}\}$ = exterior $\{N,n//q''_{=0.667}\}$ to calculate r_n, and then assign each r_n with one or more (size roughly matched) human organ(s) and/or bio-molecule(s).

q=n"=sqrt(r_n/r_{n-1})	q" = 1/n"	interior {N,n//2} $r_n = r_{n-1}$ *(q")^2 meter	assigned Human Organ, or bio-molecule	ref.
1.5	0.667	0.85	adult human height	
		3.78E-01	adult human torso	wiki "Torso",
		1.68E-01	adult human lungs	
		7.46E-02	adult human heart	/wiki/Heart, An adult heart has a size of a fist: 12 cm
		3.32E-02	adult human gallbladder	/wiki/Gallbladder, the gallbladder measures ... 7 to 10 cm
		1.47E-02	adult human eye ball	/wiki/Human_eye, adult eye has an ... diameter of 24 mm
		6.55E-03	adult human eye cornea	/wiki/Human_eye, cornea is ... 11.5 mm ... in diameter
		2.91E-03		
		1.29E-03		
		5.75E-04	human Stapedius muscle	/wiki/Stapedius_muscle, The stapedius is ... one mm in length
		2.56E-04	Golgi tendon organ	/wiki/Golgi_tendon_organ, 1 mm long ..., diameter ... 0.1 mm.
		1.14E-04		
		5.05E-05	human Egg cell, d=120 um	/wiki/Egg_cell, The human ovum ... 120 µm ... diameter.
		2.24E-05	human cone cell, length	/wiki/Cone_cell, 40–50 µm long, ... diameter ... 0.5–4.0 µm.
		9.97E-06		
		4.43E-06	averaged human cell diameter	
		1.97E-06	human cone cell, diameter	/wiki/Cone_cell, 40–50 µm long, ... diameter ... 0.5–4.0 µm.
		8.76E-07	human rod cell's nucleus	/wiki/Rod_cell, ... 2 microns in diameter and 100 microns long.
		3.89E-07	human chromosome	/wiki/Chromosome, diameter 1~2 um.
		1.73E-07		
		7.69E-08		
		3.42E-08		
		1.52E-08	ribosomes	/wiki/Ribosome, Eukaryotic ribosomes ... 30 nm ... diameter
		6.75E-09	Nucleosomes, 11 nm beads	/wiki/Chromatin, ... 11 nm beads on a string fibre.
		3.00E-09		
		1.33E-09		
		5.92E-10		
		2.63E-10	one nucleotide unit	/wiki/DNA, one nucleotide unit measured 3.3 Å long.
		1.17E-10	one atom size, H-bond r=	

In SunQM-6s4, I said: "*In {N,n} QM field theory, everything (i.e., both the point-centered mass field and the point-centered force field) can be described in the form of 3D spherical wave packet … for the general point-centered field's 3D spherical wave packet, the main probability between r_n to r_{n+1} belongs to n QM state … for a point-centered mass field's 3D spherical wave packet, the mass between r_n to r_{n+1} mainly belongs to orbit n*".

In SunQM-6s8's Appendix G, I said: "*Why Schrodinger equation/solution can be applied to both macro-world and micro-world? This is because the Schrodinger equation/solution only describes the point-centered (or a point-symmetric) radial radiating field (and also including the RF). So it can be used to describe any the point-centered (or a point-symmetric) radial radiating (mass, or force, or energy) field, like a Sun's point-centered mass field (or mass distribution), or a Sun's point-centered G/RFg-force field, or a Sun's point-centered gravitational potential field, or an atom's point-centered mass distribution, or an atom's point-centered E/RFe-force field, etc. However, for a chemical molecule, or a crystal structure, because their structures seriously deviated from a point-centered (or a point-symmetric) radial radiating field, they cannot be described by a simple Schrodinger equation/solution*".

In SunQM-7s1, I said: "*all point-centered fields (including the mass field, the force field, and the energy field) can be represented by the Schrodinger equation/solution (in form of non-Born probability as well as in form of a 3D spherical wave packet, see SunQM-6s4)*".

Now we know that for a crystal lattice, it lacks the isotropic single point-centered symmetry, so it can't be described by a simple (isotropic point-centered) Schrodinger equation/solution. For a bio-QM structure, its mass distribution lacks the single point-centered symmetry, so it can't be described by a simple (isotropic point-centered) Schrodinger equation/solution.

In SunQM-7s2, I said, "*The **non-linear {N,n} QM** structural effect is defined as: any {N,n} structure that does not strictly follow the simplest Sun{N,n//6} structure. In some cases, it still follows the standard {N,n//q} QM but with $q \neq 6$. In other cases, it may not follow {N,n//q} structure at all*". According to it, both the 1D crystal lattice's {N,n//q} and 3D crystal lattice's {N,n//q} belongs to the non-linear {N,n//q} QM. All bio-QM {N,n//q} also belongs to the non-linear {N,n} QM.

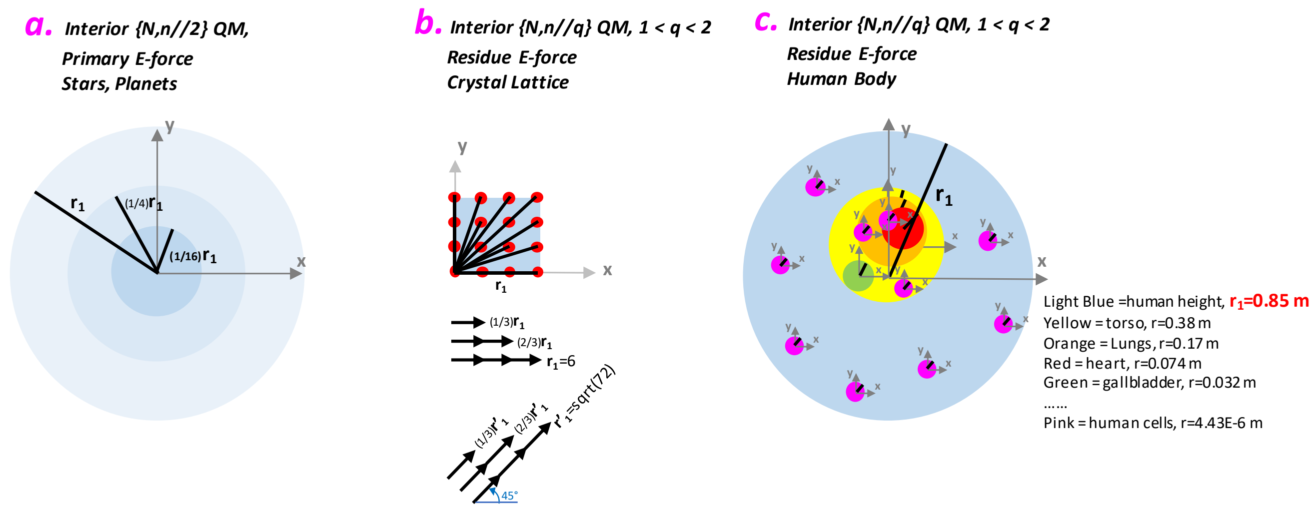


Figure 4a. Interior {N,n//2} QM governed by the primary G-force (in a planet, etc.). Note: interior {N,n//2} = exterior {N,n//(1/2)}.
Figure 4b. Interior {N,n//q} QM with 1 < q < 2, governed by the residue E-force (in a crystal lattice). Note: interior {N,n//q} = exterior {N,n//(1/q)}
Figure 4c. Interior {N,n//q} QM with 1 < q < 2, governed by the residue E-force (in a human body).

(Note: The discussion in this paragraph is highly un-sure, so it is only for myself). In the last two rows of Table 2, the multi-object (of either stars, or crystals, or human bodies)'s {N,n} QM description was compared with that of the single object (that was shown in Figure 4a, 4b, 4c):

1) For a single star's {N,n} QM description, it is essentially a r-1D {N,n//q} QM, with a single fixed q value, and with the concentric r_n(s). For multi-stars' {N,n} QM description, it is essentially a multi r-1D {N,n//q} QM, each with its own single fixed q value, and with its own concentric r_n(s).

2) For a single crystal, its anisotropic r_1 equals to many 1D {N,n//q} QM descriptions, or equivalent to a high-dimensional description (in a kind of Hilbert space), although all r_1(s) are still concentric (so it is a single Hilbert space). For multi-crystals, the un-concentric r_1(s) of all these crystals may can be described by many Hilbert-spaces.
3) For a single human body, its anisotropic r_1 equals to many 1D {N,n//q} QM descriptions, or a high-dimensional description (in a kind of Hilbert space), and all r_1(s) are un-concentric (so they are equivalent to many Hilbert-spaces). For many human bodies, the (two-leveled) un-concentric r_1(s) of all these many human bodies may can be described by a two-leveled many Hilbert-spaces.

III. Summary for the exterior {N,n//q} QM with q values from the "base-q" = 6, up to q → ∞, and down to q → 0.

Exterior {N,n//q} QM with 2 ≤ q ≤ ∞. In our universe, q = 6 is the base for the normal intensity of the normal primary forces (see SunQM-7's Table-1, and here I named it as "**base-q**"). Stronger primary force (e.g., either the high mass-density of the primary G-force near the BH surface, or high Z# density of the primary E-force near the surface of the high-Z# atomic nuclides) increases q value (from the base-q = 6) to q = 7, 8, … ∞, the weaker primary (e.g., low mass-density of the primary G-force at a planet surface) decreases q value (from the base-q = 6) to q = 5, 4, 3, 2 (see Appendix B for examples).

An exterior {N,n//q} QM structure with 1 < q < 2 is mostly (or must be?) **a condensed matter's {N,n//q} QM structure.** The q value for the residue (E- or G-) force formed QM structure is (mostly) anisotropic in the rθφ-3D space, the characteristic value of 1 < q < 2 of the residue (E- or G-) force is only along the force-line concentrated 1D {N,n//q} space (see Figure 5b).

Exterior {N,n//q} QM with q = 1. The {N,n//q} QM with q = 1 only describes a single sized structure (without any details). Practically, all spherical structures' surface-r can be defined as the r_1 for the {N,n//q} QM with q = 1. For examples, Sun's surface radius can be defined as r_1 (i.e., $r_{Sun} = r_1$) for the Sun's {N,n//1} QM structure with q = 1; Earth's surface radius can be defined as r_1 (i.e., $r_{Earth} = r_1$) for the Earth's {N,n//1} QM structure with q = 1; A drop of water's surface radius can be defined as r_1 (i.e., $r_{water} = r_1$) for this water drop's {N,n//1} QM structure with q = 1, etc. Also, see the explanation of SunQM-4's eq-41 $\omega_{n,ph} = \frac{\omega_n}{2}$, e.g., Earth's orbit {1,5//6} in the Solar system may can be alternatively described as the n=1 orbit in a {0,1//1} QM system.

Exterior {N,n//q} QM with 0 < q < 1, (that equals to the interior {N,n//(1/q)} QM). The {N,n//q} QM with 0 < q < 1 describes the smaller QM structures at the internal of a QM structure. In SunQM-1's section-II-d "*New concept: the (new) interior {N,n} QM vs. the (traditional) exterior {N,n} QM*", the interior {N,n//q} QM is exactly the same as the exterior {N,n//q'} QM with the q' = 1/q, where q is either the positive integer (for the primary force formed {N,n//q} QM structure), or the positive value (1 < q < 2 for the residue force formed {N,n//q} QM structure). Therefore, the interior {N,n//q} QM can be directly switched to the exterior {N,n//(1/q)} QM. Also see SunQM-2's section-IV-d, "*The best way to study our universe is to use the interior {N,n} QM analysis*". See examples in the Appendix C. Also see SunQM-6s6's eq-37, $E_{n,prot} \propto \frac{E_{1,prot}}{n^2}$ (where $n^2 = \frac{r_n}{r_1} < 1$, and n ∝ 1, ½, 1/3, … from ground state to excited state).

IV. Using the force-line to re-explain the residue E-force (and/or the residue G-force) in {N,n} QM

In Figure 5, I used a new way to describe the re-distribution of the force lines from the primary E-force to the residue E-force (and/or, from the primary G-force to the residue G-force). (Note: if someone else had already developed the same explanation long time ago, readers please tell me). In a xy-2D space, a (±)x-axis aligned residue (E- or G-) force (with the primary force intensity F ∝ 1/r^2, as illustrated in Figure 5a for E-force, and Figure 5c for G-force) will re-distribute its force-line (from isotropic evenly radiating to 2π) to concentrate to the (±)x-axis, increasing the force intensity along the (±)x-axis 1D-space (from F ∝ 1/r^2) to make it more like F → 1/r, while decreasing the force intensity along the (±)y-axis 1D-space (from F ∝ 1/r^2) to make it more like F → 0, (as illustrated in either Figure 5b for the residue E-force, or Figure 5d for the residue G-force). By imagination, we can use a very small charge (say, 0.001% of an electron's charge) to measure the E-force intensity (on x-axis or on y-axis) in Figure 5b.

Similarly, in a xyz-3D, a (±)x-axis aligned residue (E- or G-) force will re-distribute its force-line (from isotropic evenly radiating to 4π) to concentrate to the (±)x-axis, increasing the force intensity along the (±)x-axis 1D-space (from F ∝ 1/r^2) to make it more like F → 1/r, while decreasing the force intensity along the yz-2D-space (from F ∝ 1/r^2) to make it more like F → 0. Furthermore, I guessed that for the residue force related {N,n//q}, in the F_g → 0 region, q → 1; In the F_g → 1/r region, 1 < q < 2. This means, **the q value for the residue (E- or G-) force is not isotropic in the rθφ-3D space, the characteristic value of 1 < q < 2 of the residue (E- or G-) force is only along the force-line concentrated 1D-space**.

In SunQM-7s1, I mentioned: "*In a H-atom, a proton attracts an electron with the point-centered force* $F_{r\theta\varphi} = \frac{-e^2}{4\pi\varepsilon_0}\frac{1}{r^2}$, *... Once you integrated all force lines in the rθφ-3D space, it becomes* $\iiint F_{r\theta\varphi} = \int_0^a \int_0^{\pi} \int_0^{2\pi} \frac{-e^2}{4\pi\varepsilon_0}\frac{1}{r^2} r^2 \sin\theta \; dr\, d\theta\, d\varphi = \frac{-e^2 a}{\varepsilon_0}$. *On the other hand, if in a +x 1D-space there are two charges (one +e, one -e, with distance = a, and with a constant force* $F_x = \frac{-e^2}{\varepsilon_0}$*), then you integrated this single force line in the +x 1D-space, it becomes* $\int F_x = \int_0^a \frac{-e^2}{\varepsilon_0} dx = \frac{-e^2 a}{\varepsilon_0}$. *Both results are the same. So, I believed that by collapsing a point-centered 3D force into a x-1D force, you can collapse a point-centered rθφ-3D space into a +x 1D-space. Or, a rθφ-3D force with* $F_r \propto \frac{1}{r^2}$ *is equivalent to a x-1D force with the constant strength* $F_x \propto x^0$".

So, for a primary force F = 1/r^2 radiated in rθφ-3D space, after the rθφ-3D space degenerated into +x 1D-space, this force becomes F = 1 (constant). Similarly, for a primary force F = 1/r^2 radiated in rθφ-3D space, after the rθφ-3D space degenerated into ±x 1D-space, this force becomes F = 1/r^b, with 0 < b < 2, and here, we can use the simplest approximation b=1, or F = 1/r, for the illustration. Figure 6 compared the r-dependent force intensity for all these three forces (F=1, F=1/r, and F=1/r^2). We can see that at the longer distance (r > 1), the force intensity is (F=1) > (F=1/r) > (F=1/r^2). This means, at a longer distance, the residue E-force (or residue G-force, with F → 1/r) has the higher force intensity than that of the primary E-force (or primary G-force, with F ∝ 1/r^2).

Now, considering to rotate a polyacetylene rope (as illustrated in Figure 1a) with one end (r_0) fixed and the second end free, the (original) rotational orbital motion's radial force (F ∝ 1/r^2, as shown in Figure 5a) is now changed to +x 1D-space's F = constant.

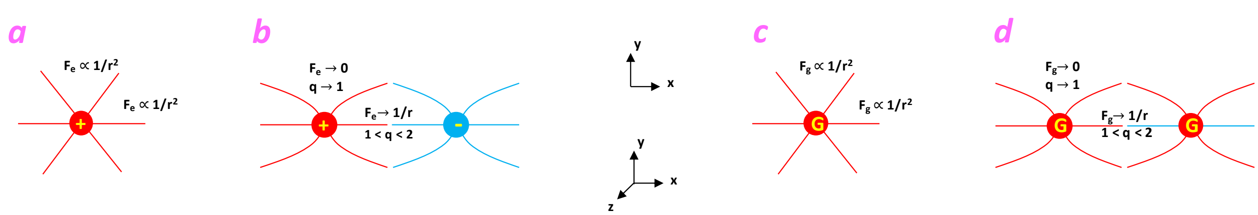


Figure 5a. To illustrate the primary E-force with its force-lines radiated isotopically in all 4π direction in rθφ-3D space.
Figure 5b. To illustrate the residue E-force with its force-lines concentrated in the +x and -x two (straight-line) 1D-space. For the residue force related {N,n//q}, in the F_e → 0 region, q → 1; In the F_e → 1/r region, 1 < q < 2.
Figure 5c. To illustrate the primary G-force with its force-lines radiated isotopically in all 4π direction in rθφ-3D space.
Figure 5d. To illustrate the residue G-force with its force-lines concentrated in the +x and -x two (straight-line) 1D-space. In the F_e → 0 region, q → 1; In the F_e → 1/r region, 1 < q < 2.

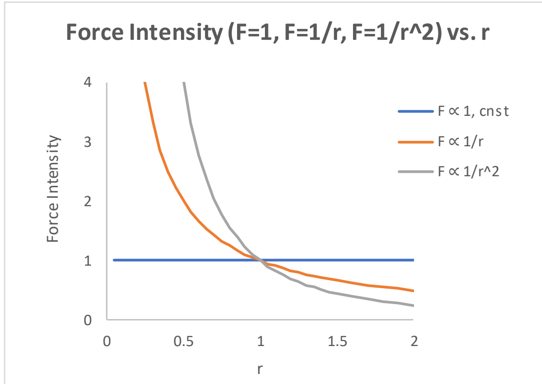


Figure 6. To show that at the longer distance (r > 1), the force F = 1/r (orange curve) has the higher force intensity than that of the force F = 1/r^2 (grey curve).

V. New Concept: The matter in the two arms of a galaxy can be treated as the condensed matter that governed by the residue G-force in a spiral-line 1D-space (along this galaxy arm's spiral-line 1D-space)

According to text books, the far-end of a galaxy's arm rotates too fast if it is governed only by the SMBH's primary G-force, (and that is why the concept of dark matter was introduced). In SunQM-6s8's section-V, I proposed that, "*the r-1D G-force (actually is the residue force of the G-force) between the neighboring gas molecules/dusts/stars provided a "σ-bond" kind of* ~~*primary*~~ (residue) *force to stabilize the arm structure (as a chain structure), and the parallel spin-spin interaction (that belongs to the RFg-RFg interaction) between the neighboring gas molecules/dusts/stars provided a "π-bond" kind of secondary force to further stabilize the arm structure (as a chain structure). This virtual "σ-bond" and virtual "π-bond" strengthen the arm structure to be a virtual "polyacetylene-like chain". So when rotating (along the SMBH of the final galaxy), the out half of the "chain" rotates much faster than the orbital velocity produced by the pure r-1D G-force (of the final galaxy)*". Based on the result in the section-I (i.e., the 1D crystal lattice's {N,n//q} description for a 1D condensed matter), here I proposed another new concept: The matter in the two arms of a galaxy can be explained as the condensed matter that governed by the residue G-force in a spiral-line 1D-space (along this galaxy arm's spiral-line 1D-space). Following is the detailed explanation.

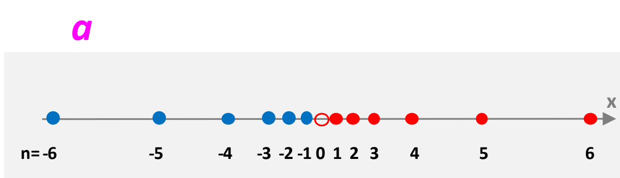
Figure 7a showed a 1D exterior {N,n//q} structure with q > 1, and $r_n = r_1 q^2$, in a (straight-line) ±x 1D-space. Notice that it could be {N,n//2}, so that $r_{n=\pm1} = \pm4r_1$, $r_{n=\pm2} = \pm4\times4r_1 = \pm16r_1$, $r_{n=\pm3} = \pm4\times16r_1 = \pm64r_1$, etc., or it could be {N,n//q=1.5}, so that $r_{n=\pm1} = \pm(1.5)^2 r_1$, $r_{n=\pm2} = \pm(1.5)^2\times(1.5)^2 r_1$, $r_{n=\pm3} = \pm(1.5)^2\times(1.5)^2\times(1.5)^2 r_1$, etc., or it could be any q value within the range of 1 < q < 2. (Note-1: this 1 < q < 2 is good for describing the condensed matter's {N,n//q} QM structure, or **a {N,n//q} QM structure with 1 < q < 2 must be a condensed matter's {N,n//q} QM structure**. Note-2: Figure 1a (with $\Delta r_n = r_n - r_{n-1}$ = constant, with q_n = variable for each n, and with all q_n values within the range of 1 < q < 2) is a special case of Figure 7a. Alternatively, Figure 7a (with $\Delta r_n = r_n - r_{n-1}$ = variable, with q_n = constant for all n(s), and with 1 < q < 2) is also a special case of Figure 1a).

Figure 7b showed that, when a (straight-line) ±x 1D-space (in Figure 7a) is rotated and/or twisted (at the center of n=0 end, but not much at the n >> 0 ends), it becomes a spiral-line 1D-space, and its 1D {N,n//q} QM structure is changed from Figure 7a to Figure 7b. I believed that the matter distribution in the two (symmetric) arms of all two armed galaxies can be described by the spiral-line-1D exterior {N,n//q} shown in Figure 7b. (Note: We still need mathematician to prove it). In this way, for the matter in the two arms of a galaxy, it is not only exerted (mainly) by the primary G-force (and also the RFg-force) from the SMBH of the galaxy (in the r-1D space of the rθφ-3D space), but also by the residue G-force in the (galaxy arm's) spiral-line 1D-space (as the "σ-bond"). Because (in the condensed matter physics), the condensed matter is formed by the residue E-force (like a 1D crystal lattice), the arm structure of a galaxy should also can be treated as the condensed matter structure that formed by the residue G-force (in the galaxy arm's spiral-line 1D-space).

Then, the fast rotational speed of the far-end of the galaxy's arm is not caused by the SMBH's primary G-force, but is mainly caused by the residue G-force in the (galaxy arm's) spiral-line 1D-space (as the condensed matter that connected by the "σ-bond"). This is more or less like that rotating a polyacetylene rope around one end, the far-end of the rope's rotation speed is very fast (because the rope is controlled by the residue E-force formed chemical bond, or σ-bond (plus the π-bond), not by the primary E-force. And, from Figure 5 and Figure 6, we know that the residue E-force has a longer effective exertion distance than that of the primary E-force). In other words, the galaxy arm's matter has two properties (in superposition): the Newtonian Matter property and the Condensed Matter property. It is mainly the Condensed Matter property (in the galaxy arm's spiral-line 1D-space) that caused the fast rotational speed (at the far-end of the galaxy's arm). As I said in SunQM-6s8, "*If this model is correct, then the "dark matter" is no longer "dark", it is the regular matter of cosmic gas/dust that formed a virtual chain structure, and this chain structure is formed under the residue G-force (that formed virtual "σ-bonds" among gas/dust/star) and RFg-forces (that formed virtual "π-bonds" among gas/dust/star)*".

In the MOND (Modified Newtonian dynamics) theory (see wiki "MOND"), I guessed that the original single point-centered Newtonian force field $F \propto 1/r^2$ can be replaced by a single point-centered $F = 1/r^b$ kind of force field with $0 < b < 2$ (in the long distance range, or at the far-end of a galaxy's arm). Although in our residue E-force (and/or residue G-force) description, it also has $F = 1/r^b$ force field with $0 < b < 2$, it only exerts in the +x 1D-space, or ±x two of (spiral-line) 1D-spaces, and it does not exert in all 4π direction in rθφ-3D space. So, in view of {N,n} QM, the MOND's $F \propto 1/r^b$ isotropic in all 4π direction in rθφ-3D space is not correct, or, a single point-centered $F \propto 1/r^b$ force field is not good for describing the higher rotational speed of a galaxy's arm.

Note-1: If the higher rotational speed of a galaxy's arm is governed by a single point-centered $F \propto 1/r$ force field (as MOND said) then a crystal lattice (that rotating along its mass center) should can also be governed by a single point-centered $F \propto 1/r$ force field. Note-2: If the higher rotational speed of a galaxy's arm is caused by the "Dark Matter", then a crystal lattice (that rotating along its mass center) should can also be caused by the "Dark Matter".



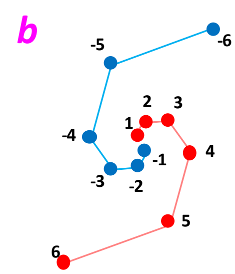


Figure 7a. Illustration of a 1D {N,n//q} with q > 1, and $r_n = r_1 q^2$, in a (straight-line) ±x 1D-space.
Figure 7b. Illustration of a 1D {N,n//q} with q > 1, and $r_n = r_1 q^2$, in a spiral-line 1D-space.

VI. New Concept: The multi-arm structure (that extended from any one node of the cosmic web) can be treated as the condensed matter structure that governed by the residue G-force in a multiple (curved-line) 1D-space

The cosmic web structure (see in Figure 8a) in our universe can be treated as the residue G-force formed multiple arms (or multiple filaments with the number of 3, 4, 5 ...) in the 3D space (or alternatively, 3, 4, 5 … of 1D-space along each arm/filament). So these 3D web-structured (or a multi-1D-arm structured) matter can be treated as the condensed matter (in each of the 1D-space along that arm/filament).

Similarly, in a C_{60} Buckyball, a C-atom has three C-C bonds (see Figure 8b, actually two C-C bonds mixed with a C=C bond). It can be treated as the residue E-force formed three arms/filaments (in a rθφ-3D space, or, alternatively, three of +x 1D-space along each one of the C-C bond or C=C bond). This is similar as the two arms (in a xy-2D-space) in a galaxy.

So, to describe the residue E-force (or residue G-force) under the {N,n//q} QM structural format, (i.e., under the multiple 1D-space format), now we have at least five (slightly different) kind multiple 1D-spaces:
1) +x single (straight-line) 1D-space, as shown in Figure 1a;
2) ±x two (straight-line) 1D-space, as shown in Figure 7a;
3) ±x two (spiral-line) 1D-space, as shown in Figure 7b;
4) Multiple (straight-line) 1D-space, as shown in Figure 8b;
5) Multiple (curved-line) 1D-space, as shown in Figure 8a.

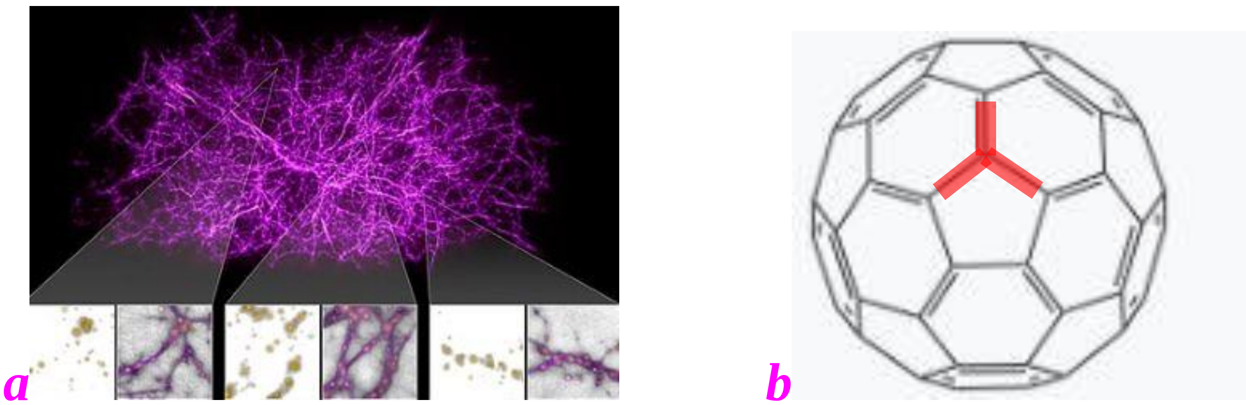


Figure 8a (left). "Map of the Cosmic Web Generated from Slime Mould Algorithm" (www.spacetelescope.org). Copied from: wiki "Observable universe". Author: ESA/Hubble, Copyright: CC BY 4.0.
Figure 8b (right). A Buckyball. Copied from: wiki "Buckminsterfullerene". Author: Leyo. Copyright: Public Domain. A modification of the three of +x 1D-space (from any single C-atom, along each one of the three C-C or C=C bonds, in red color) was added.

VII. If F×r equals to the same constant for all three primary forces (G-, E-, and S-), then can we estimate the size of our universe?

(Note: This should go to SunQM-7's section-VIII, or go to SunQM-7s1).

Because our universe's {N,n//q} QM structure has a fixed q=6 for all the N super shells (ranging from N=10 (Virgo Super Cluster) to N= -17 (a quark), see in SunQM-7's Table-1), (I guessed that) it may suggest that our universe has a relative same "strength density" of the primary forces throughout the whole size range (up from the Virgo Super Cluster, and down to a quark). Since G-force is much weaker than E-force and/or S-force [40], then, we may should create a brand new parameter "primary force strength density" (something like the force strength divided by the volume of the space that the force is exerting), so that we can say that the "primary force strength density" of the G-force, the E-force, and the S-force is relatively the same in our university (throughout the whole size range, up from Virgo Super Cluster, and down to a quark, because they all have q = 6).

Based on this idea, I built the Table 5, to search for the possible "primary force strength density" for the primary G-, E-, S-forces, and to see at what size ranges, the "strength density" of these three forces become a single constant value. At the beginning, I did not know how to calculate the "primary force strength density", so I picked four possible ways: F×r, F/r, (for the force either times the distance, or divided by the distance), and F×r^3, F/r^3 (for the force either times volume, or divided by volume). After the search in Table 5, I found only F×r gave a convergent (or nearly constant) value for all three primary forces in their own meaningful force-exerting range (see the green cells in Column 6 of Table 5, with the F×r values between

1E-13 and 1E-12). Thus, I **defined F×r (or F×x) value as the "primary force strength density"**. Then, to explain this result, I organized following explanations.

1) Why it is F×r, (but not the F/r, F×r^3, F/r^3), gave the meaningful (nearly) constant value for all three primary forces in their own meaningful force-exerting range?
Answer-1: As I explained before (see section-IV), for a point-centered primary force field F ∝ 1/r^2 in a rθφ-3D space, once we degenerate this rθφ-3D space into a +x 1D-space, this +x 1D-force intensity F (∝ constant) become a r-independent value. Then, the values of F×r, (or, F×x, but not the F/r, F×r^3, F/r^3), become more comparable for all three primary forces. Thus, F×x is physically meaningful to be the "primary force strength density" for the primary G-, E-, S-forces.
Answer-2: In SunQM-7s1's Fig-3, in a r'rθφ-4D space, our university's rθφ-3D can be treated as the 1D-space out of a (r')(rθφ)-2D space. Also, in a r'rθφ-4D space, our university's r-1D (that is the x-1D) can be treated as the 1D-space out of a (r'θφ)(r)-2D space. This may also explain that why the F×r = constant, or F×x = constant, is meaningful).

2) From the textbook [40], we know that the relative strength of primary G-, E-, S-forces is 10^{-38} to 10^{-2} to 1 (see the column 2 of Table 5). According to SunQM-7's Table-1, for the G-force, its effective action range can be estimated from {-5,1//6} size to the {15,1//6} size or even larger size; for the E-force, its effective action range can be estimated from outside a proton size {-15,1//6} to the (theoretical possible) maximum atom size at {-10,1//6}; for the (single point-centered) S-force, its effective action range can be estimated from outside a quark size {-17,1//6} to the (theoretical possible) maximum atom's nuclear size at {-12,1//6}, (see column 5 of Table 5). Then, we see that the "primary force strength density" F×r (or F×x) showed converged values (between 1E-13 and 1E-11, see the green cells in column 6 of Table 6) for all three primary forces in each force's adequate action space range: for the G-force, it is from {11,1//6} to {12,1//6}; for the E-force, it is from {-12,1//6} to {-11,1//6}; for the (single point-centered) S-force, it is from {-13,1//6} to {-12,1//6}.

3) One possible interpretation for this result is, the G-force (including the residue G-force)'s effective exertion range ended at around {12,1//6} size, the E-force (including the residue E-force)'s effective exertion range ended at around {-10,1//6} size, and the (single point-centered) S-force (including the residue S-force)'s effective exertion range ended at around {-12,1//6} size. In the largest scaled space of each forces, all three forces kept the same "primary force strength density" (i.e., F×r = 1E-13 ~ 1E-11). Then, for this reason, our universe {N,n//q} QM structure has a fixed q=6 for the super shell N range from N=10 (Virgo Super Cluster) to N= -17 (a quark).

4) Then, (if G-force is the longest-distance force in our universe, or, there is no "+1" force as shown in SunQM-7's Table-1 Column-1), this result may further reveal that, our universe has a final size at around either {11,1//6} or {12,1//6}.
Note: In SunQM-7's Table-2 "*A list of cosmic {N,n//6} QM structures at N ≥ 10*", I listed a number of cosmic "great walls" with distance around 9E+9 lys, including U1.11 (d ≈ 8.8E+9 lys), Huge-LQG (d ≈ 9E+9 lys), Giant GRB Ring (d ≈ 9.1E+9 lys), The Giant Arc (d ≈ 9.2E+9 lys), Clowes–Campusano LQG (d ≈ 9.5E+9 lys), and Hercules–Corona Borealis Great Wall (d ≈ 1E+10 lys). Interestingly, they all located in the {11,2//6} size range. Also, in SunQM-7's section-IV-a "*A 3D spherical space with circumference 2πr = 9E+9 lys*", I hypothesized that "*1) Our universe (as a 3D spherical space) may should have a circumference of 9E+9 lys, which equivalent to the size of {11,2//6} ... ; 2) This means that at any one direction, our universe has a unique distance of d = 2πr = 9E+9 lys, anything we see beyond that is merely the repeating of the previous unique distance of d = 2πr = 9E+9 lys; 3) All galaxies in the galactic walls (of U1.11, Huge-LQG, Giant GRB Ring, the Giant Arc, Clowes–Campusano LQG, and Hercules–Corona Borealis Great Wall, etc.,) are the images of our own Milky Way galaxy (or the local cluster of galaxies) at about 9E+9 years ago, and are viewed at all different angles ...*". Therefore, the result in Table 5 may strongly support my hypothesis in SunQM-7's section-IV-a, that is, our universe is "*A 3D spherical space with circumference 2πr = 9E+9 lys*", with the size at around {11/1//6} to {12,1//6}.

5) Or, it may mean that the G-force (and the residue G-force) may end at the size of {11,1//6} or {12,1//6}. Beyond that, a possible new primary force (that was named as the "+1" force in SunQM-6's Table-3, or in SunQM-7's Table-1) may act as the effective force.

6) Furthermore, in SunQM-7s1, I hypothesized that "*in a (onion-like) 4D ball space, the orbital shell space in which our 3D universe located has a "4D temperature" of lightspeed c*". Here, I further hypothesized that**, the same "primary force strength density" (i.e., F×r = 1E-13 ~ 1E-11) for all three primary forces (G-, E-, S-) in our rθφ-3D universe may reveal that, all these three primary forces (G-, E-, S-) may have the same intrinsic "4D temperature" in the r'rθφ-4D space, and they are all (in some way) equivalent to the lightspeed c (that is also the "4D temperature") in our universe, and that is why (in our universe) all three primary forces (G-, E-, S-) propagate their fields in the speed of light**. (Note: If this is correct, then the G-force may have different propagation speed in the different layers of the onion-like r'rθφ-4D space).

7) Because the ratio of 1 / 0.01 / 1E-38 (in the column 2 of Table 5) is the relative strength ratio, F×r has a relative unit. However, usually F×r should have a unit of the potential energy. Therefore, the relationship between the F×r as the "primary force strength density" and F×r as the "potential energy" should be further explored in the future.

Table 5. Calculate the "primary force strength density" F×r (or, F×x) values for the three primary (E-, G-, S-) forces.

	strength*	action space	{N,n//6} size	r =	F X r	F / r	volume	F X Vol	F / Vol	r value obtained from
				meter			m^3	*m^3	1/m^3	
G-force	1E-38	Solar System	{5,1//6}	8.32E+15	8.32E-23	1.20E-54	2.41E+48	2.41E+10	4.15E-87	SunQM-5, Tab-1, cold-r
	1E-38	Milky Way galaxy	{8,1//6}	3.88E+20	3.88E-18	2.58E-59	2.45E+62	2.45E+24	4.09E-101	
	1E-38	Virgo Super Cluster	{10,1//6}	5.03E+23	5.03E-15	1.99E-62	5.33E+71	5.33E+33	1.88E-110	
	1E-38	Giant GRB Ring, The Giant Arc**	{11,1//6}	1.81E+25	1.81E-13	5.52E-64	2.49E+76	2.49E+38	4.02E-115	
	1E-38	observable universe^	{12,1//6}	6.52E+26	6.52E-12	1.53E-65	1.16E+81	1.16E+43	8.62E-120	
	1E-38		{13,1//6}	2.35E+28	2.35E-10	4.26E-67	5.41E+85	5.41E+47	1.85E-124	
	1E-38		{14,1//6}	8.45E+29	8.45E-09	1.18E-68	2.53E+90	2.53E+52	3.96E-129	
	1E-38		{15,1//6}	3.04E+31	3.04E-07	3.29E-70	1.18E+95	1.18E+57	8.49E-134	
	1E-38		{20,1//6}	1.84E+39	1.84E+01	5.44E-78	2.61E+118	2.61E+80	3.84E-157	
E-force	0.01	proton size	{-15,1//6}	1.13E-15	1.13E-17	8.82E+12	6.11E-45	6.11E-47	1.64E+42	
	0.01		{-14,1//6}	4.08E-14	4.08E-16	2.45E+11	2.85E-40	2.85E-42	3.51E+37	
	0.01		{-13,1//6}	1.47E-12	1.47E-14	6.81E+09	1.33E-35	1.33E-37	7.52E+32	
	0.01	H-atom n=1 electron r	{-12,1//6}	***5.29E-11***	5.29E-13	1.89E+08	6.20E-31	6.20E-33	1.61E+28	SunQM-5, Tab-1, electron-r
	0.01	H-atom n=6 electron r	≈{-11,1//6}	1.90E-09	1.90E-11	5.25E+06	2.89E-26	2.89E-28	3.46E+23	
	0.01	theory, max atom	{-10,1//6}	6.86E-08	6.86E-10	1.46E+05	1.35E-21	1.35E-23	7.41E+18	
S-force	1	quark size	{-17,1//6}	6.48E-19	6.48E-19	1.54E+18	1.14E-54	1.14E-54	8.77E+53	
	1		{-16,1//6}	2.33E-17	2.33E-17	4.29E+16	5.32E-50	5.32E-50	1.88E+49	
	1	proton size	{-15,1//6}	***8.40E-16***	8.40E-16	1.19E+15	2.48E-45	2.48E-45	4.03E+44	SunQM-5, Tab-1, proton-r
	1		{-14,1//6}	3.02E-14	3.02E-14	3.31E+13	1.16E-40	1.16E-40	8.63E+39	
	1		{-13,1//6}	1.09E-12	1.09E-12	9.19E+11	5.40E-36	5.40E-36	1.85E+35	
	1	theory, max nucleus	{-12,1//6}	3.92E-11	3.92E-11	2.55E+10	2.52E-31	2.52E-31	3.97E+30	
Weak-force	1.E-06									

* [40].

** See SunQM-7's Table-2.

Conclusion

A 1D crystal lattice structure can be described by using the 1D {N,n//q} QM with 1 < q < 2. A 3D crystal lattice structure can be described by using multiple 1D crystal lattice's {N,n//q} QM. A bio-structure (like a human body) can also be described by using multiple 1D {N,n//q} QM with 1 < q < 2 and with many un-concentric r_1(s). The force-line re-distribution (from isotropic to anisotropic) can be used to explain the extra-long exertion distance of the residue E-force (and residue G-force). Thus, the matter in the two arms of a galaxy can be treated as the condensed matter that governed by the residue G-force in a spiral-line 1D-space (along this galaxy arm's 1D-space). The multi-arm structure (that extended from any one node of the cosmic web) can also be treated as the condensed matter structure that governed by the residue G-force in a multiple (curved-line) 1D-space.

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Note: A series of SunQM papers that I am working on:
SunQM-9s2: Addendums, Updates and Q/A for SunQM series papers (part-2). (in drafting since 2022).

Note: Major QM books, data sources, software that I used for the study (in the SunQM series papers):
Douglas C. Giancoli, Physics for Scientists & Engineers with Modern Physics, 4th ed. 2009.
David J. Griffiths, Introduction to Quantum Mechanics, 2nd ed., 2015.
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(Free) online spherical 3D plot software: MathStudio (http://mathstud.io/)
(Free) offline math calculation software: R
Microsoft Excel, Power Point, Word.
Public TV's space science related programs: PBS-NOVA, BBC-documentary, National Geographic-documentary, etc.
Journal: Scientific American.

Note: I am still looking for endorsers to post all my SunQM papers (including the future papers) to arXiv.org. Thank you in advance!
So far, my identity (for the {N,n} QM development) is: a former lecturer of Fudan University, and a (10 years closed-door, 2014 ~ 2024) citizen scientist of California.

Note: With my 38 of SunQM research articles that have been posted out so far, I believe that the framework of the {N,n} QM has been fully established. It is clear now that the {N,n} QM description is suitable not only for the mass field, but also for the force field (or the energy field, etc.). It may even be suitable for the condensed matter physics, and for the bio-QM structure. Thus, my ~10 years of closed-door research phase (2014 ~ 2025) on the {N,n} QM is ended. After that, I will re-write the SunQM articles (~38 of them) in form of a textbook. The initial plan is, Phase-1) Try to formally publish all ~38 of SunQM articles as the original version (version-1, or version-2018) if possible; Phase-2) Using ~2 years, to (globally) revising all ~38 of SunQM articles (as version-2, or version-2025), the main purpose is to unify the nomenclature and the description, to compress the total words from over 450,000 to as less as possible, (and publish it if possible), make it ready for the textbook writing; Phase-3) Using 2 ~ 4 years, to write a Bohr-QM based {N,n} QM textbook (with ~100,000 words, as version-3, for high-school students), formally publish it if possible, and may make a few online video lectures; Phase-4) Using 2 ~ 4 years, to add Schrodinger-equation based {N,n} QM into the version-3 textbook with final ~200,000 words (as version-4, for college students), formally publish it if possible, and may make a few online video lectures. Note: Since August 2025, due to the serious injury at my low back spine, I may be unable to continue this work.

Note: The {N,n} QM was built on three building blocks: the Newtonian mechanics (or the classical physics), the Bohr-QM (i.e., $r_n = r_1n^2$ for the H-atom), and the Schrodinger equation/solution for the H-atom. Thus, I also wish that the {N,n} QM (or any fragment of it) can be the useful building material for other scientists (or the scientific community) to build either the more completed QM theories, or the more diversified QM theories.

Appendix A. Other possible (and non-essential) q values in the {N,n//q} QM for the condensed matter 1D structures

Table 6. Using the {N,n//3} kind of format and Bohr formula $r_n = r_1 n^2$ to describe the 1D "Condensed Matter {N,n//q} QM structure" for a 1D array (r_n = 0, 2, 4, 6, …).

traditional QM's n			1D array's	{N,n//3}				
n=	r_1=	$r_n = r_1 * n^2$	r_n =		r_1=	n"=sqrt(n/n_{r1})	$r_n = r_1$*(n")^2	q = n" (variable)
			0					
1	2	2	2	{0,1//3}	2	sqrt(1/1) = 1	2	
2		8	4	{0,2//3}	2	sqrt(2/1) = 1.414	4	sqrt(2/1) = 1.414
3		18	6	{0,3//3}={1,1//3}	6	sqrt(3/3) = 1	6	sqrt(3/3) = 1
4		32	8	{1,2//3}	6	sqrt(4/3) = 1.154	8	sqrt(4/3) = 1.154
5		50	10	{1,3//3}={2,1//3}	10	sqrt(5/5) = 1	10	sqrt(5/5) = 1
6		72	12	{2,2//3}	10	sqrt(6/5) = 1.095	12	sqrt(6/5) = 1.095
7		98	14	{2,3//3}={3,1//3}	14	sqrt(7/7) = 1	14	sqrt(7/7) = 1
8		128	16	{3,2//3}	14	sqrt(8/7) = 1.069	16	sqrt(8/7) = 1.069
9		162	18	{3,3//3}={4,1//3}	18	sqrt(9/9) = 1	18	sqrt(9/9) = 1
10		200	20	{4,2//3}	18	sqrt(10/9) = 1.05	20	sqrt(10/9) = 1.05
…		…						
infinity		infinity	infinity		→ ∞	→ 1	→ ∞	→ 1

Note: n_{r1} means the n value at the r_1 of each super shell N (= 0, 1, 2, …).

Table 7. Using the {N,n//6} kind of format and Bohr formula $r_n = r_1 n^2$ to describe the 1D "Condensed Matter {N,n//q} QM structure" for a 1D array (r_n = 0, 2, 4, 6, …).

traditional QM's n			1D array's	{N,n//6}				
n=	r_1=	$r_n = r_1 * n^2$	r_n =		r_1=	n"=sqrt(n/n_{r1})	$r_n = r_{n-1}$*(n")^2	q = n" (variable)
			0					
1	2	2	2	{0,1//6}	2	sqrt(1/1) = 1	2	
2		8	4	{0,2//6}	2	sqrt(2/1) = 1.414	4	sqrt(2/1) = 1.414
3		18	6	{0,3//6}	2	sqrt(3/1) = 1.732	6	sqrt(3/1) = 1.732
4		32	8	{0,4//6}	2	sqrt(4/1) = 2	8	sqrt(4/1) = 2
5		50	10	{0,5//6}	2	sqrt(5/1) = 2.236	10	sqrt(5/1) = 2.236
6		72	12	{0,6//6}={1,1//6}	12	sqrt(6/6) = 1	12	sqrt(6/6) = 1
7		98	14	{0,7//6}	12	sqrt(7/6) = 1.080	14	sqrt(7/6) = 1.080
8		128	16	{0,8//6}	12	sqrt(8/6) = 1.154	16	sqrt(8/6) = 1.154
9		162	18	{0,9//6}	12	sqrt(9/6) = 1.224	18	sqrt(9/6) = 1.224
10		200	20	{0,10//6}	12	sqrt(10/6) = 1.29	20	sqrt(10/6) = 1.29
11		242	22	{0,11//6}	12	sqrt(11/6) = 1.35	22	sqrt(11/6) = 1.35
12			24	{0,12//6}={1,2//6}	12	sqrt(12/6) = 1.41	24	sqrt(12/6) = 1.41
18			36	{0,18//6}={1,3//6}	12	sqrt(18/6) = 1.73	36	sqrt(18/6) = 1.73
24			48	{1,4//6}	12	sqrt(24/6) = 2	48	sqrt(24/6) = 2
30			60	{1,5//6}	12	sqrt(30/6) = 2.23	60	sqrt(30/6) = 2.23
36			72	{1,6//6}={2,1//6}	72	sqrt(36/36) = 1	72	sqrt(36/36) = 1
72			144	{2,2//6}	72	sqrt(72/36) = 1.4	144	sqrt(72/36) = 1.4
108			216	{2,3//6}	72	sqrt(108/36)=1.7	216	sqrt(108/36)=1.7
144			288	{2,4//6}	72	sqrt(144/36) 2	288	sqrt(144/36) 2
180			360	{2,5//6}	72	sqrt(180/36)=2.2	360	sqrt(180/36)=2.2
216			432	{2,6//6}={3,1//6}	432	sqrt(216/216)=1	432	sqrt(216/216)=1
…								
infinity		infinity	infinity			→ 1	→ ∞	→ 1

Note: n_{r1} means the n value at the r_1 of each super shell N (= 0, 1, 2, …).

Appendix B. Examples that the weaker primary G-force decreases q value to q = 5, 4, 3, 2

As shown in SunQM-3s6's Table-6, as the primitive Earth ($r_{PrimitiveEarthSurface}$ = 2.58E+7 meters) lost its primitive atmosphere (by lost 24/25 of its primitive mass), to become a terrestrial Earth (r_{Earth} = 6.46E+6 meters), its primitive Earth's {N,n//q} changed from {N,n//2}, (that is r_{Earth} = 6.46E+6 meters, Earth's inner core = (1/4) * r_{Earth}), to {N,n//4}, (that is r_{Earth}

= 6.46E+6 meters, Earth's liquid iron core = (3/4)^2 * r_{Earth} , Earth's solid iron core = (2/4)^2 * r_{Earth} , Earth's inner-inner core = (1/4)^2 * r_{Earth}). As shown in SunQM-5, this kind of q change in the {N,n//q} may can be written as {N,n//4}={N,n//2//2}.

Furthermore, in SunQM-3s6's section-I-I, I said "*let us try to use n' = 2^4 = 16, or p{N,n//16} QM structure to analyze Earth's internal structure. From wiki "Earth", Earth inner core's r = 1.28E+6 meter, and it matches 6.38E+6 *(7/16)^2 = 1.22E+6 m, so the inner core is a p{-1,7//16} QM structure of Earth (notice that before we always approximate Earth's inner core as p{-1,2//4} = p{-1,8//16}, its accurate size is actually a p{-1,7//16} QM structure). Earth outer core's r = 3.49E+6 meter, and it matches 6.38E+6 *(12/16)^2 = 3.59E+6 meter, so the outer core is a p{-1,12//16} = p{-1,3//4} QM structure of Earth. Earth mantle's r = 5.68E+6 meter, and it matches 6.38E+6 *(15/16)^2 = 5.61E+6 meter, so Earth's mantle structure is a p{-1,15//16} QM structure of Earth*". In this way, this kind of q change in the {N,n//q} may can be further written as {N,n//16} = {N,n//2//2//2//2}.

Appendix C. Examples of {N,n//q} QM with q < 1, (that equals to the interior {N,n//(1/q)} QM)

Following example-1 through example-6 were originated from the previous results of the {N,n//q} QM, but switched to the {N,n//(1/q)} format.

Example-1: For q = ½, Sun can be described as {N,n//(1/2)} QM structure with $r_{SunSurface} = r_1$, and the Sun core as the n = ½ (with $r_{SunCore} = r_1 n^2$ = (1/4) * $r_{SunSurface}$ = (1/4) * 6.96E+8 = 1.74E+8 meters, (see in SunQM-1's Table-2).

Example-2: For q = 1/3, Saturn can be described as {N,n//(1/3)} QM structure with $r_{SaturnSurface} = r_1$, with an Earth-sized core at $r_{SaturnCore} = r_1 n^2$ = (1/9) * $r_{SaturnSurface}$, (see SunQM-3s4's Table-2).

Example-3: For q = ¼, Earth can be described as {N,n//(1/4)} QM structure with $r_{EarthSurface} = r_1$, the Earth's liquid iron core as the n = 3/4 (with $r_{3/4} = r_1 n^2 = r_{EarthSurface}$ * (3/4)^2), the Earth's solid iron core as the n = 2/4 (with $r_{2/4} = r_1 n^2 = r_{EarthSurface}$ * (2/4)^2), the Earth's inner-inner core as the n = 1/4 (with $r_{1/4} = r_1 n^2 = r_{EarthSurface}$ * (1/4)^2). See SunQM-3s4's Table-6.

Example-4: For q = 1/5, Jupiter can be described as {N,n//(1/5)} QM structure with $r_{JupiterSurface} = r_1$. See in SunQM-1s3's Table-1b, if {N,n//(1/5)} is correct for Jupiter, then Jupiter's Earth-sized core has $r_{JupiterCore} = r_1 n^2$ = (1/25) * $r_{JupiterSurface}$ ≈ 3.75E+6 meters; However, if {N,n//(1/3)} is correct for Jupiter (because of the q=1/5 and q=1/3 superposition), then Jupiter's Earth-sized core has $r_{JupiterCore} = r_1 n^2$ = (1/9) * $r_{Jupiter}$ ≈ 1.02E+7 meters.

Example-5: For q = 1/6, Sun core can be described as the {5,1//(1/6)} QM structure with $r_{SolarSystem} = r_1$ (see in SunQM-1's Table-3).

Example-6: For q = 1/7, at the high Z#, all atoms' electron orbits may have switched from {N,n//6} QM to {N,n//7} QM (see SunQM-5's Table-2 Cloumn-21), or, we can use the interior {N,n//(1/7)} QM to describe.

Appendix D. Without using the General Relativity (GR) theory, the {N,n//q} QM theory is able to produce the size of a Sun-massed black hole, and the length contraction on the surface of the black hole, etc.

(Note: This should go to SunQM-7s2). One of the most important achievements of the {N,n//q} QM is, without using the GR theory, the {N,n//q} QM theory is able to produce the size of a Sun-massed black hole, and the length contraction on the surface of the black hole, etc.

1) From SunQM-6s6's Fig-10, "*To illustrate the quantum collapse of a H-atom (or a compressed pseudo "H-atom") that correlates to the celestial body collapse from a {0,2//6} Sun to a {-1,1//6} white dwarf, then to a {-2,1//6} star, then to a {-3,1//6} black hole*", we can obtain a special sized Sun-massed celestial body at the size of {-3,1//6}, in which all H-atoms' n=1 electrons are compressed into H-atoms' nuclides and merged with the protons to form neutrons. This special sized Sun-massed celestial body is the Sun-massed black hole.

2) From SunQM-7s1's Fig-2 and Fig-3, I assumed that our universe is the spherical 3D space on the surface of 4D ball something, and a black hole in our universe is a surface "dent" that "sink inward" in the 4^{th} dimension. Then, from SunQM-7s2's Fig-1, by approximate a r'rθφ-4D virtual oscillator to be a quasi-2D (r' vs. rθφ) virtual oscillator, then viewed from rθφ-quasi-1D, we obtained the length contraction factor $\Delta r = \Delta r_0 \sqrt{1 - \frac{{v_r}^2}{c^2}}$ in the rθφ-quasi-1D space, (that equivalent to in the real r-1D space of the rθφ-3D space).

3) From SunQM-7s2's eq-25, $q' = \frac{q}{\sqrt{1 - \frac{{v_r}^2}{c^2}}}$, I figured out that the on the surface of a Sun-massed {-3,1//6} celestial body, the maximum length contraction (to zero) is caused by the q' value increased to infinity (in the {N,n//q} QM structure).

The above analysis showed that, by purely using the {N,n//q} QM theory, without using any GR theory, we can obtain a Sun-massed black hole, and the length contraction to zero at the surface of this Sun-massed black hole. I hope that we may can use {N,n//q} QM theory to deduce out all the results of GR theory. If so, then it may suggest that both {N,n//q} QM theory and GR theory are correct.

Appendix E. A Schrodinger equation/solution's local wave packet itself can be described by a new Schrodinger equation/solution

In SunQM-4, a planet Earth can be described by a Schrodinger equation/solution's location wave (or wave packet) at a rθφ position. And then, this Earth, (or, the rθφ local position's wave (or wave packet) itself), can be described by a new Schrodinger equation/solution. This means, a Schrodinger equation's solution's local wave (or wave packet) itself can be described by a new Schrodinger equation/solution (that is centered at this local position). Note: This should be moved to SunQM-6s4's section-VI.