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BINODIC PERIODIC SYSTEM, NEW MATHEMATICAL PARADIGM.

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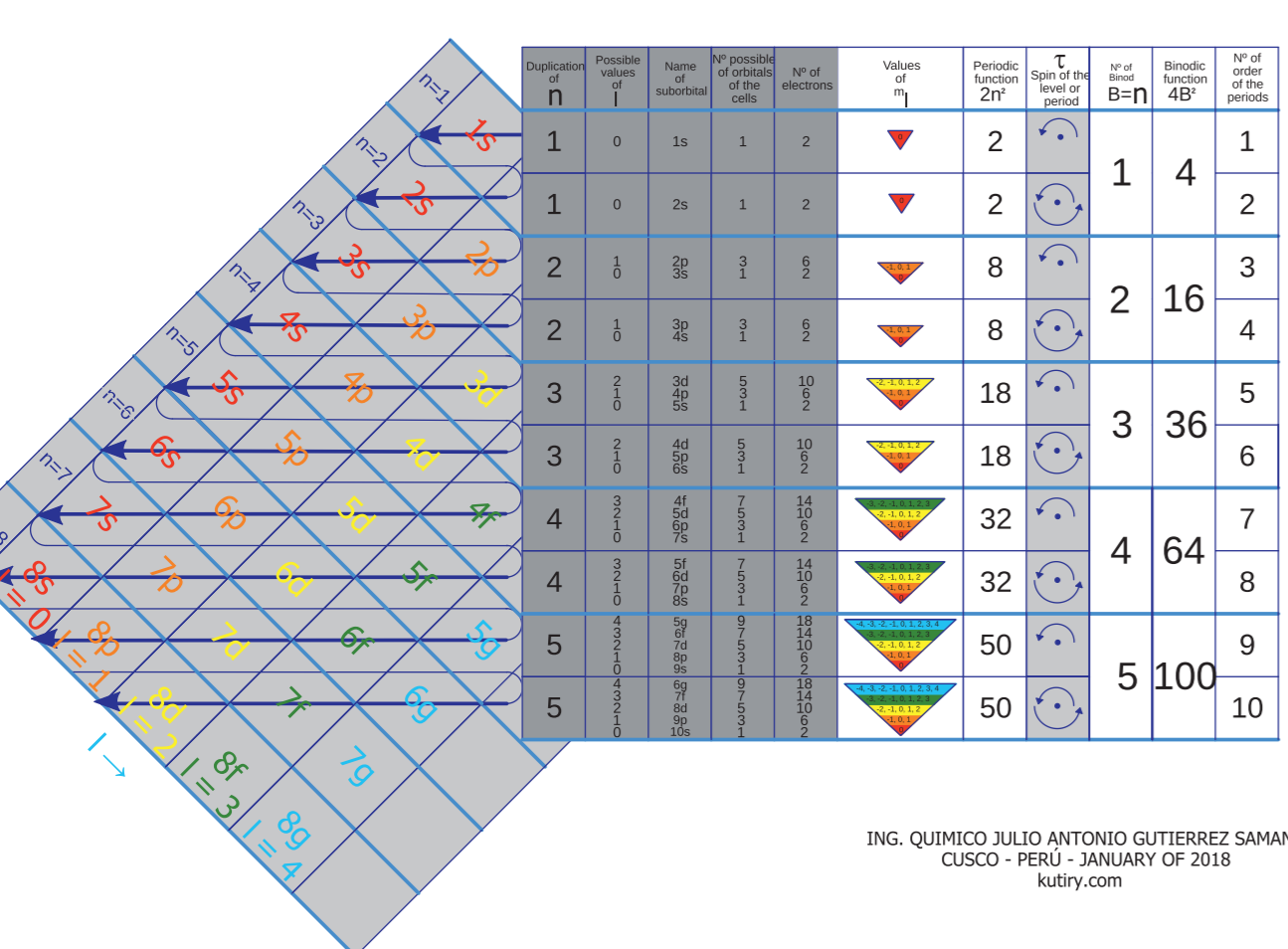
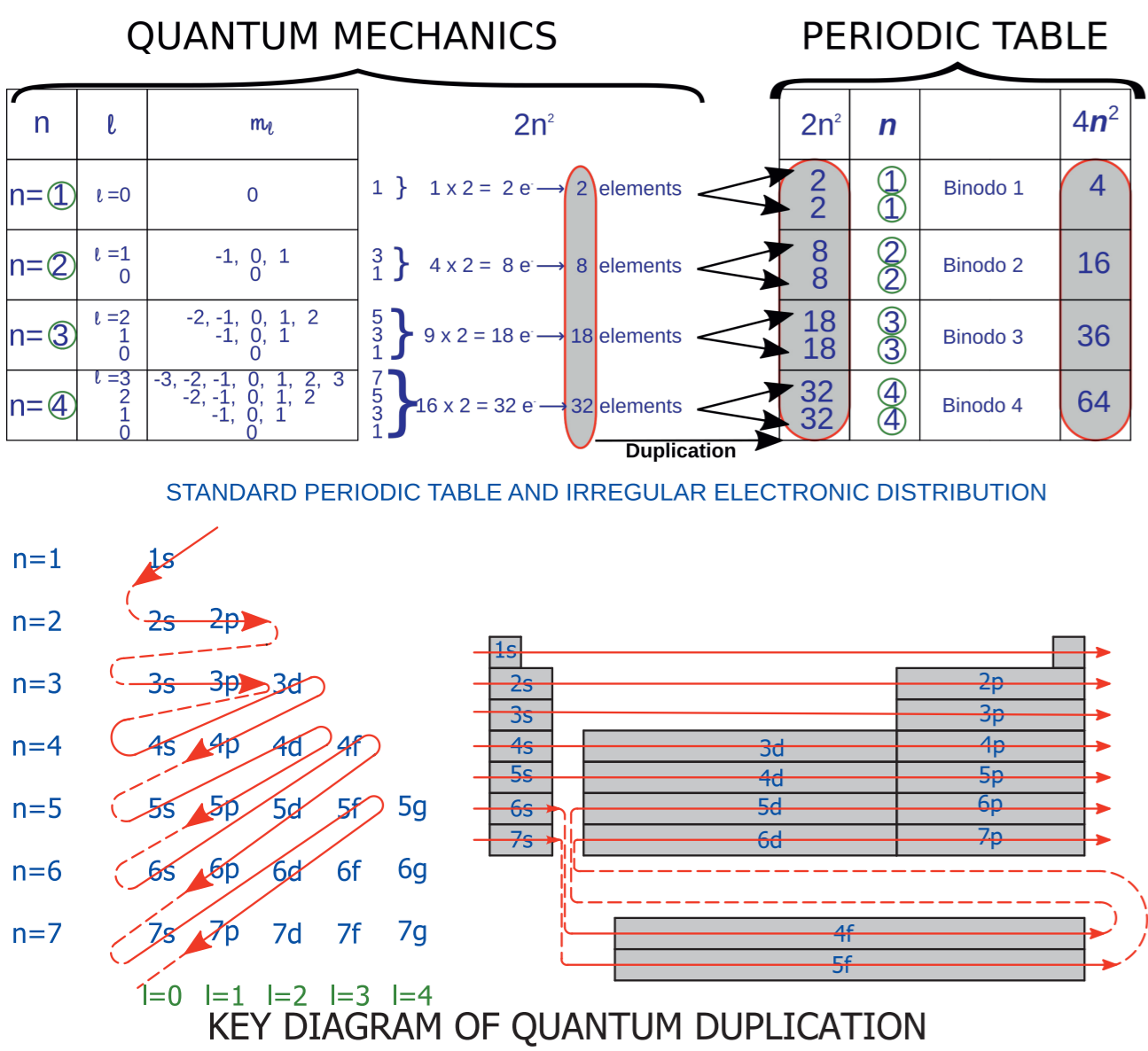
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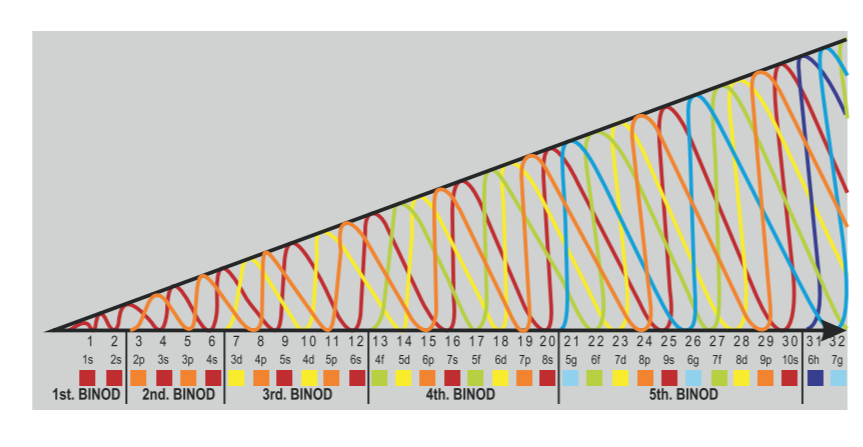
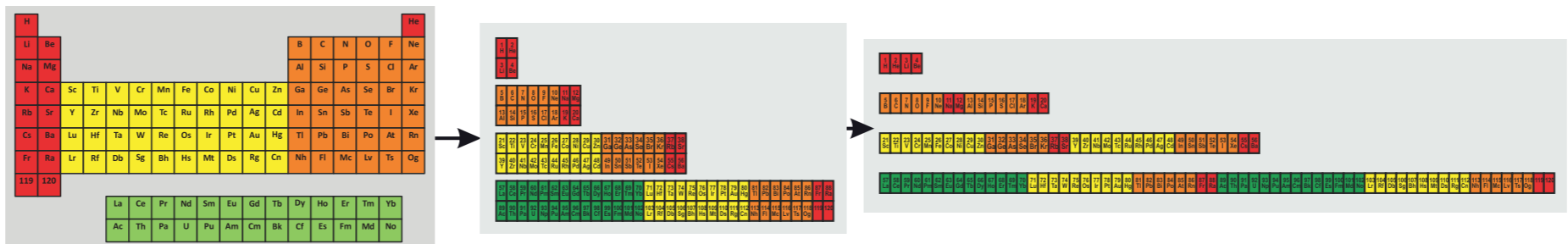
ABSTRACT
This article deals with the mathematization of the chemical periodic system as a matrix of functions, which leads to a quadratic function or "binodic function" (formed by pairs of periods or binods, which describes the periodic Law as an increasing function, of the main quantum number: (n). It's operates with dialectical laws: that generate: first, gradual quantitative changes: (2n²), with "duplication" of periods: (2n², 2n²), and, second, radical quantitative changes: (4n²), with the appearance of new quantum transitions, the growth of the format and the change of the binods, (qualitative change). We use the analytical and graphical methods [1] which mathematizes Mendeleev's law, making the size of the binods (Y) and the continuous series (Z) dependent on the number of the binod (B), which is the same number (n).
Likewise, we show the graphic representation, 2D, of a continuous self-similar spiral function of the elements, in a geometric growth pattern. Finally, a 3D animation of the helical conical function that describes the position of each of the elements, according to the laws: (2n²) and (4n²). This hypothesis can graph a Kuhnian paradigm in the process of change, since it is postulated as an idealized mathematical generalization of the Periodic Law, from which all types of periodic tables can derive, including the standard table.

To name these pairs of periods, Oswaldo Baca Mendoza [8] devised the word "binod" (in See "Genetic Laws of the Chemical Elements, New Periodic System" Universidad Nacional del Cusco, 1953, P. 14. (See Annex 1, Baca Mendoza's Periodic table)
In the article cited in which he tries to demonstrate the beauty and heuristic of the dialectic, NS Imyanitov, rehabilitates this method considering that it fell into oblivion after having been dogmatized and misused by "totalitarian regimes", in detriment of the advance of the sciences, fact "harmful to the modern paradigm and needs to be corrected" this author believes that the Philosophy of chemistry still does not pay enough attention to the Dialectic and the synergetic and believes that: "intuitive and dialectical thinking" natural "is common to many intellectuals. It is formed as a result of the understanding of reality and research."
The Dialectic as "science of the concatenations", its laws and its importance in science, has been developed by Engels (1820-1895), from a materialist interpretation of the Hegelian dialectic. (Alluding to Engels F. Dialectic of Nature).
Imyanitov also takes into account that: "in modern natural sciences the current flows in the opposite direction to idealism" (Imyanitov 2003b, p.10).

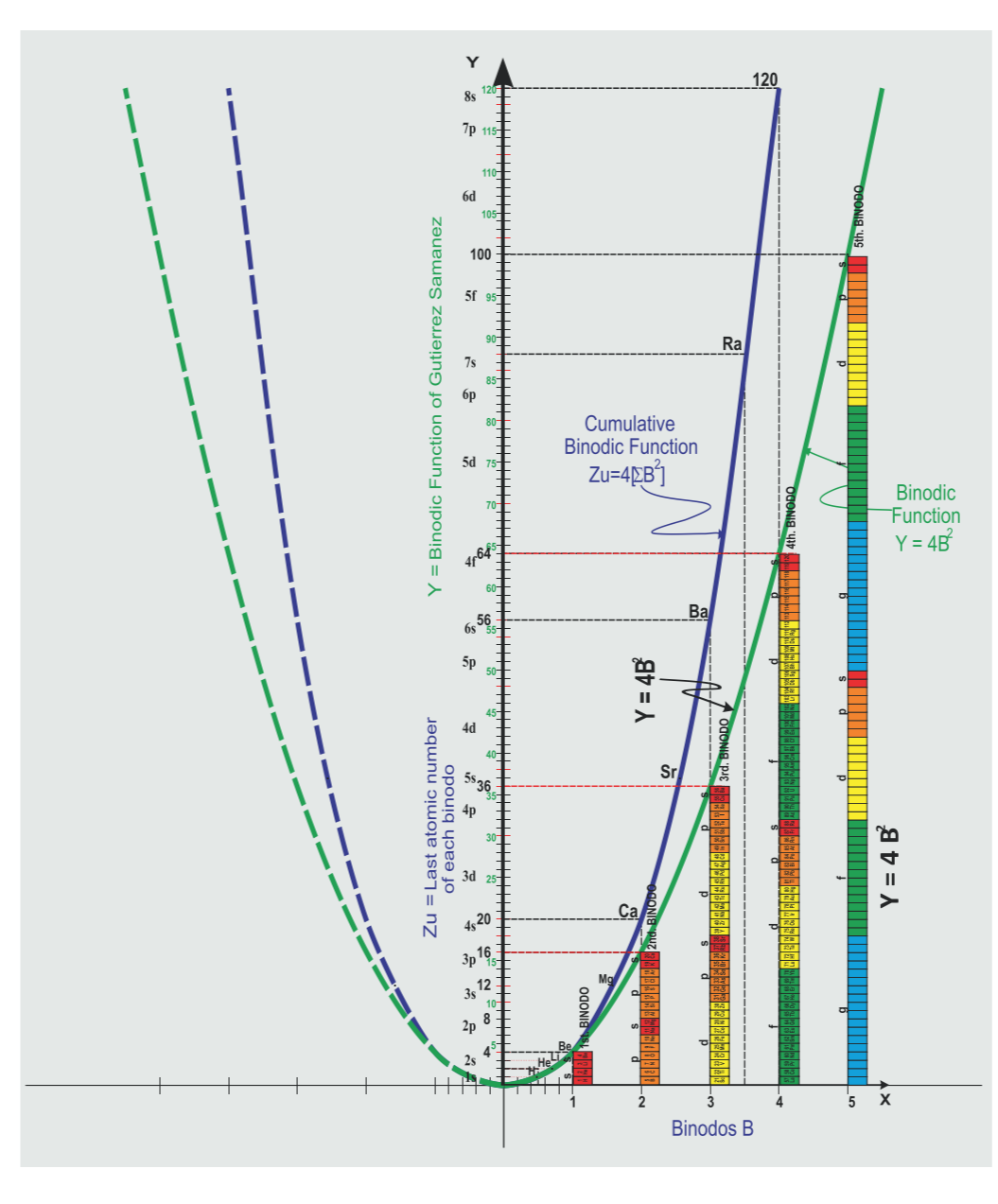
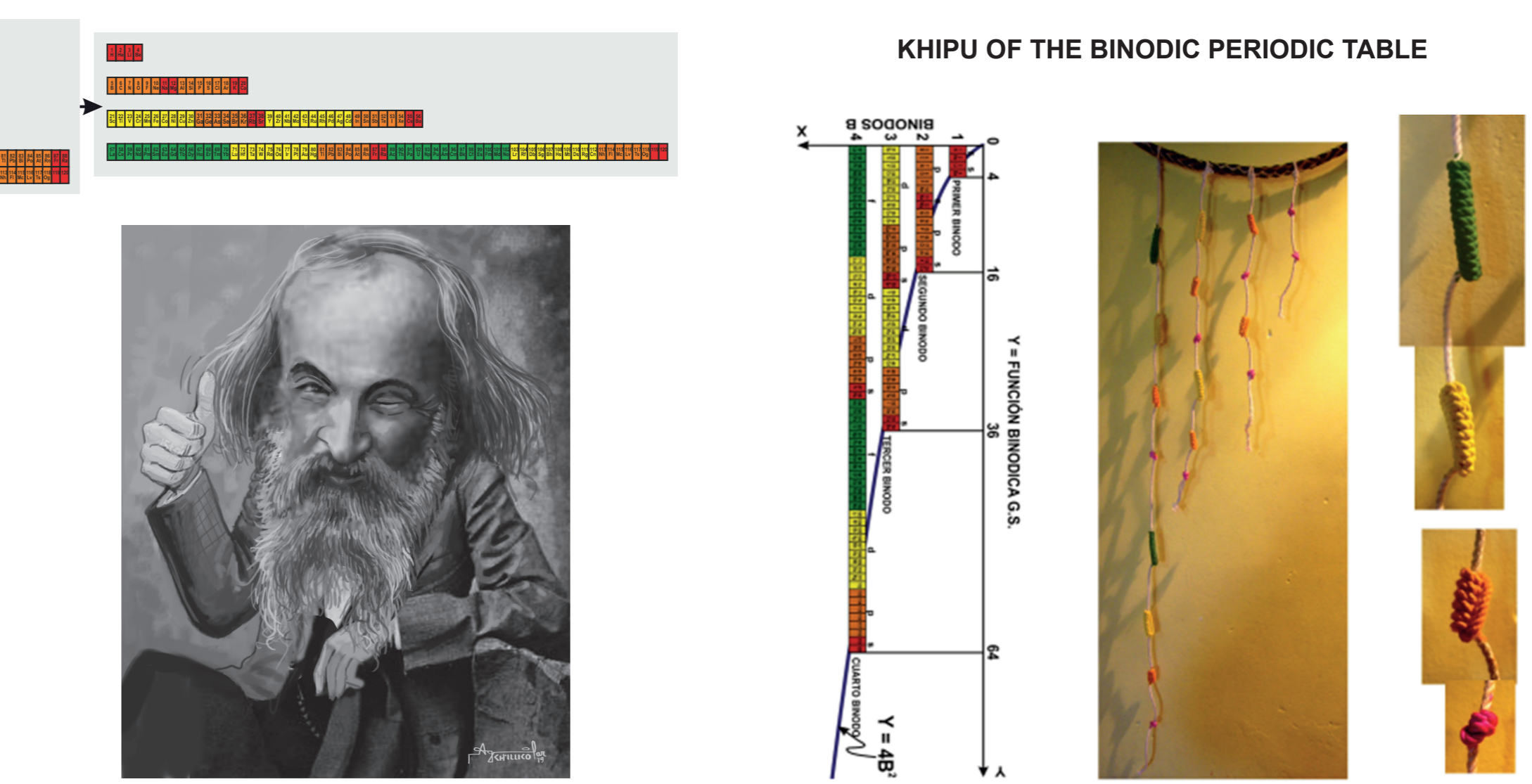
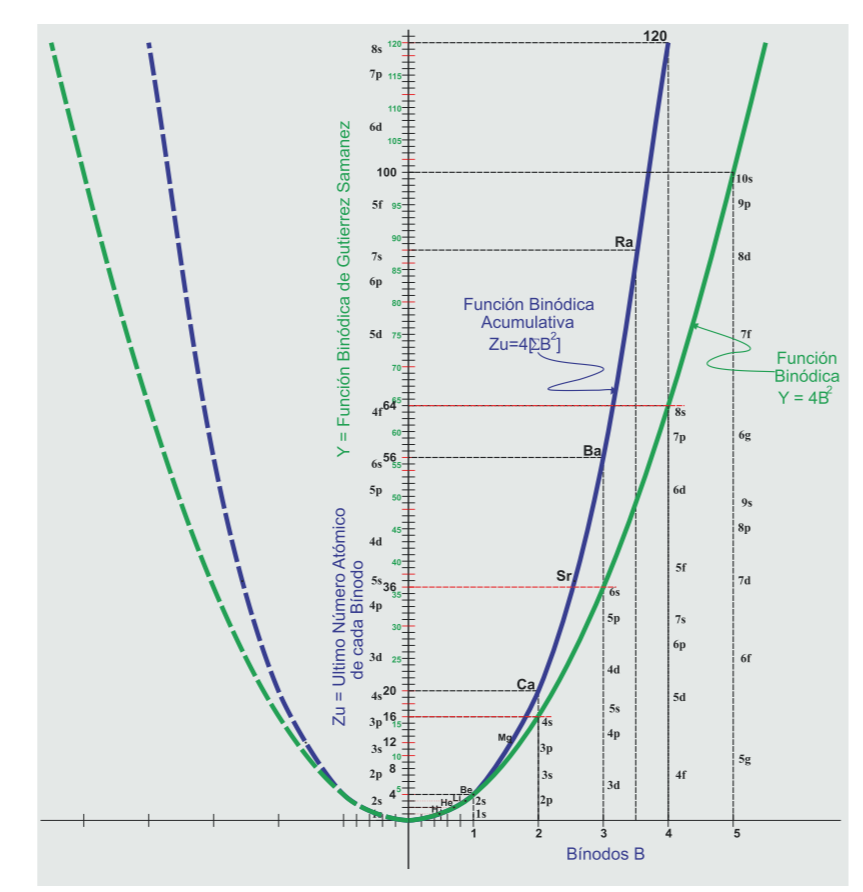
I.- CONFLICT OF PARADIGMS
In the search for mathematical relations that regulate the Periodic Chemical Law, the present author has studied the method and the "Genetic Laws" of the Peruvian scientist Oswaldo Baca Mendoza (1953) [8] (See Annex 1), for its application to the model of Charles Janet (1928) (See Annex 2), finding similarity with the mathematical expression and the series equal "to quadruple square of positive natural numbers": (4 (1², 2², 3², 4², 5² ...) = (4, 16, 36, 64, 100 ...)), which Johannes Rydberg [9] had discovered in 1912. Across this range, Rydberg had divided the Periodic System into four "double-periods" (as we might perceive them from the conventional, present-day perspective). The series is: 2, 2, 8, 8, 18, 18, 32, 32 ... This sequence that emerged from the spectroscopic observation was subsequently changed and distorted (as stated by Hakala) [10] and adapted to the ordinary table of seven periods with the series: 2, 8, 8, 18, 18, 32, 32...
The author takes up Rydberg's proposal, since the quantum number n, apparently "duplicates" or unfolds, as paired periods in the binod (n, n); so that the binod is formed by two contiguous and symmetrical periods that have the same quantum number n; consequently, the same number of elements (Fig. 1), and, as seen



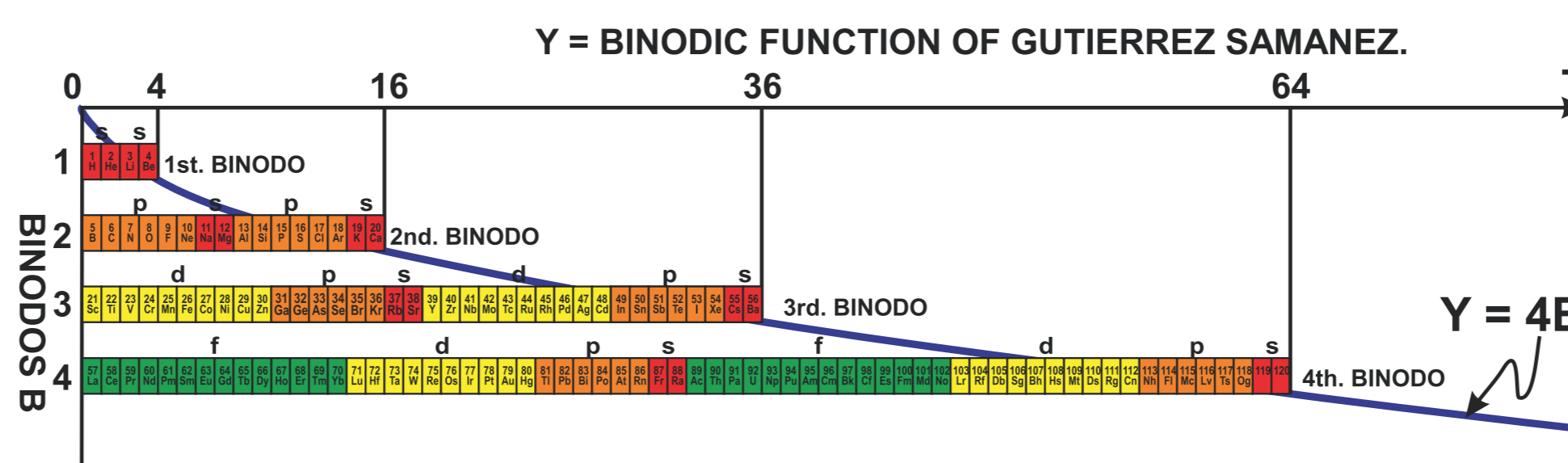
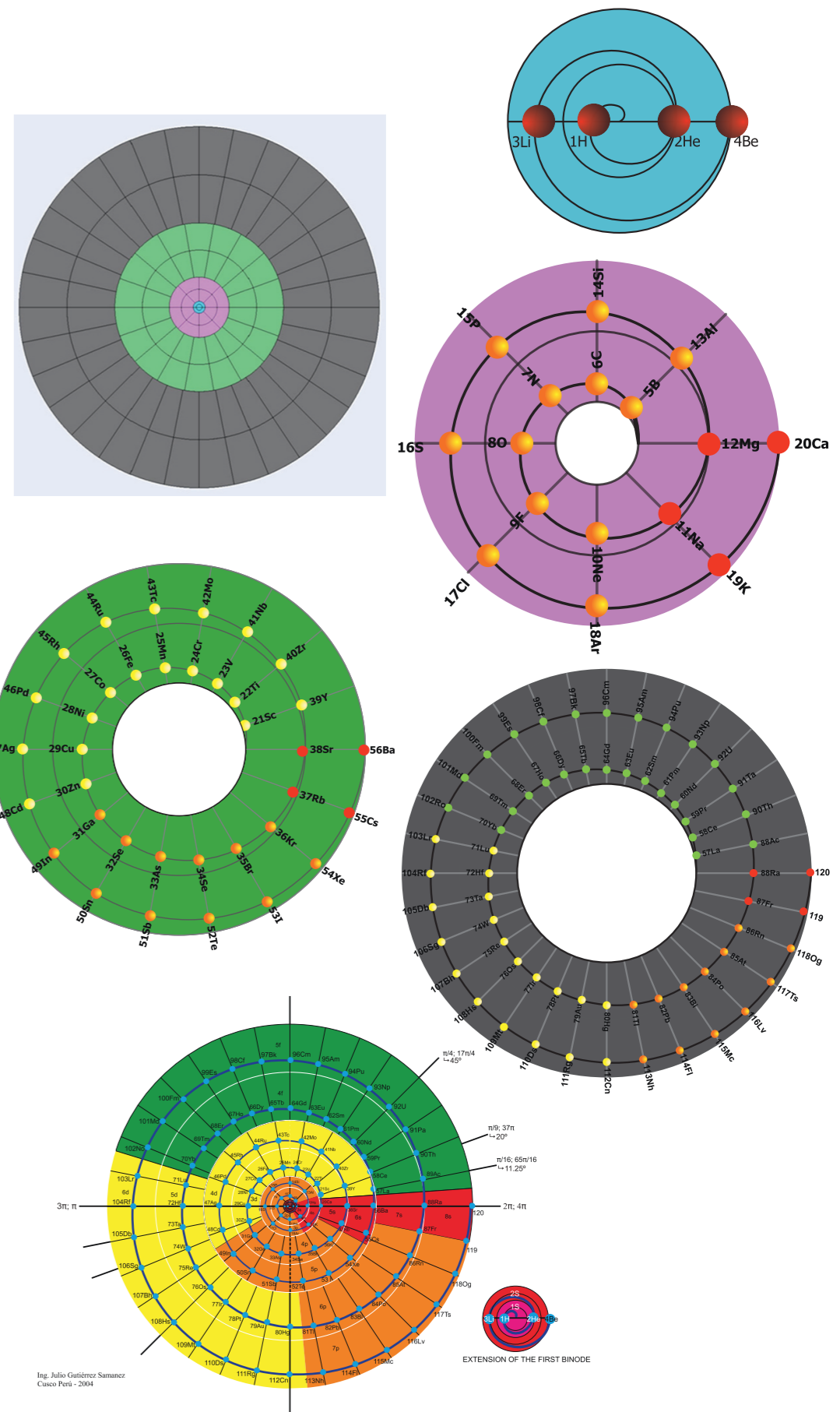
II.- GENETIC LAWS OF THE PERIODIC SYSTEM
LAW OF FORMATION OF NUCLEI AND PERIODS (Horizontal distribution)
 $Z = k + 1 (n)$
Where, K takes the value of 1 and (n) takes values of: 0, 1, 2, 3, 4...
Then, Z will take the values of the infinite number series: 1, 2, 3, 4, 5, 6... corresponding to the protons of the nuclei of the elements. Original proposal of Baca Mendoza.
LAW OF GROUPS (Vertical distribution). (Modification of the author, of the Baca Mendoza proposal)
All the columns of the table are formed, varying the value of Z.
a.- For the stepped form of right step:
 $Z_g = Z + [2(0 + 1 + 1^2 + 2^2 + 3^2 + 3^2 + 4^2 + 4^2 + 5^2 + 5^2 \dots)]$; for $Z \geq 1$
Example: for $Z = 1$
 $Z_g = 1, 3, 5, 13, 21, 39, 57, 89, 121$
 $Z_g = 1H, 3Li, 5B, 13Al, 21Sc, 39Y, 57La, 89Ac, 121, 171...$
b.- For the stepped form of left step (LSTP) or proposal of Janet.
 $Z_g = Z + [2(1 + 1 + 2^2 + 2^2 + 3^2 + 3^2 + 4^2 + 4^2 + 5^2 + 5^2 \dots)]$; for $Z \leq 0$
Example: for $Z = 0$
 $Z_g = 2, 4, 12, 20, 38, 56, 88, 120, 170, 220...$
 $Z_g = 2He, 4Be, 12Mg, 20Ca, 38Sr, 56Ba, 88Ra, 120, 170, 220...$
So far, the tables are matrices formed by a quantity Z, of columns.
The stepped form is generated by discarding the rows of repeating elements.
LAW ON LIMITATION OF PERIODS (Stepped distribution) (Modification of the author, of the Baca Mendoza proposal)
 $P = 2 (n^2, n^2) = 2 (1^2, 2^2, 2^2, 3^2, 3^2, 4^2, 4^2, 5^2, 5^2, \dots) = 2, 2, 8, 8, 18, 18, 32, 32, 50, 50...$
Where, P is the size of the period or the maximum number of elements per period and is an expression of the law:
(2n²). Generating function of the periods or periodic function itself.
(n) is the level type, which appears duplicated, it is also the main quantum number (n) = 1, 2, 3, 4, 5...
then:
 $P = (2n^2, 2n^2)$
Then: $P = (2, 2, 8, 8, 18, 18, 32, 32, \dots)$. Series, identical to Rydberg's, which determines the sizes of the periods or steps of a ladder that goes down to the left or to the right, depending on the case.
In 2002, the author published the following two staggered tables (right step and left step), mathematized with the Baca Mendoza system.



Distribución espectral	1s ²	2s ²	2p ⁶	3s ²	3p ⁶	4s ²	4p ⁶	5s ²	5p ⁶	6s ²	6p ⁶	7s ²	7p ⁶	8s ²
Nº de electrones por nivel	2	2	6	2	6	2	6	2	6	2	6	2	6	2
Nº de nivel o de periodo	1	2	3	4	5	6	7	8						
Tipo de nivel o periodo	I	II	III	III	III	IV	IV	IV						
Nº de electrones por nivel	2	2	8	8	18	18	32	32						
Nº de Binodos	1	2	3	4										
Nº de electrones por Binodo	4	16	36	64										
Función binodica(Y)	$Y = 4B^2$													



IV. HELICAL FORMS IN TWO AND THREE DIMENSIONS



PERIODIC ARMONIC TABLE OF CHEMICAL ELEMENTS B - 1 SYSTEM
By Julio Antonio Gutiérrez Samanez Chemical Engineer - Cusco Perú 2002

Law of formation of nuclei (Horizontal or synchronic series)
 $Z = K + 1(n)$ para $n \geq 0$

Law of groups formation (Vertical or diachronic series)
 $Z_g = Z + [2(0 + 1 + 1^2 + 2^2 + 3^2 + 3^2 + 4^2 + 4^2 + 5^2 + 5^2 \dots)]$ para $Z \geq 1$

Law of limitation of periods
 $P = 2(1^2, 1^2, 2^2, 2^2, 3^2, 3^2, 4^2, 4^2, 5^2, 5^2, \dots)$

n	Z	1st Binodo	2nd Binodo	3rd Binodo	4th Binodo
1	1	H			
2	3	Li, Be	B, C, N, O, F, Ne		
3	11	Na, Mg	Al, Si, P, S, Cl, Ar	K, Ca	
4	19	K, Ca	Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn	Ga, Ge, As, Se, Br, Kr	Rb, Sr
5	37	Rb, Sr	Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd	In, Sn, Sb, Te, I, Xe	Ba, La
6	55	Ba, La	Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg	Tl, Pb, Bi, Po, At, Rn	Ra
7	87	Ra	Rf, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr	Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr	

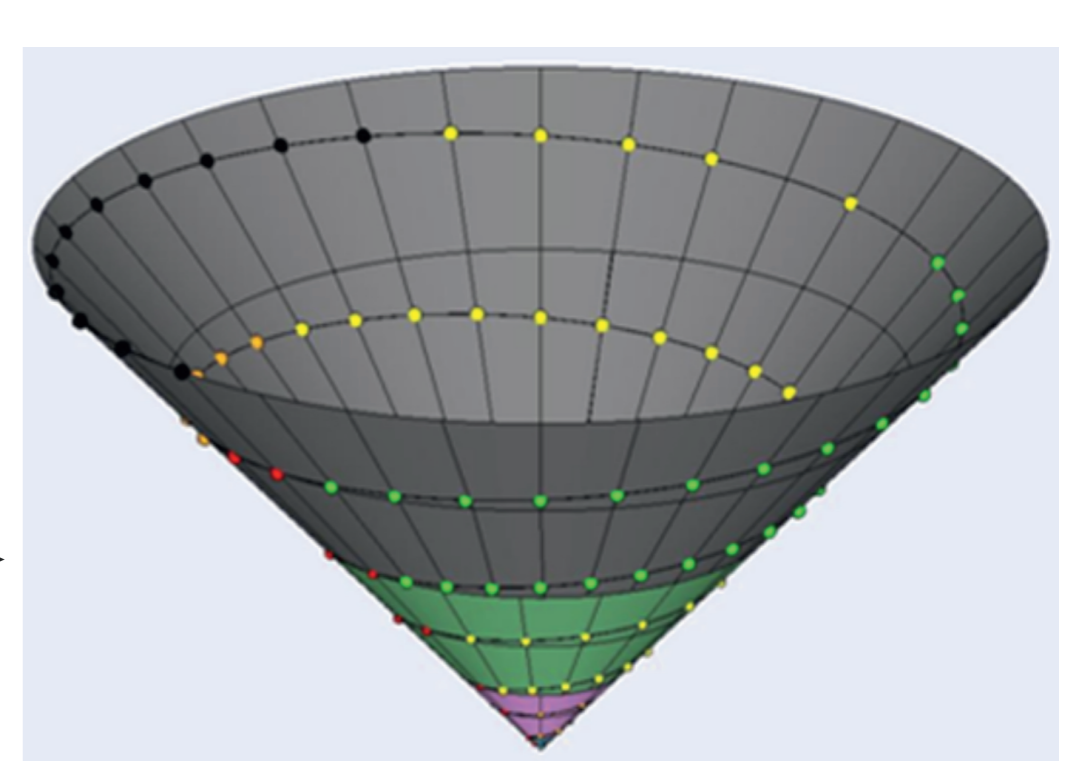
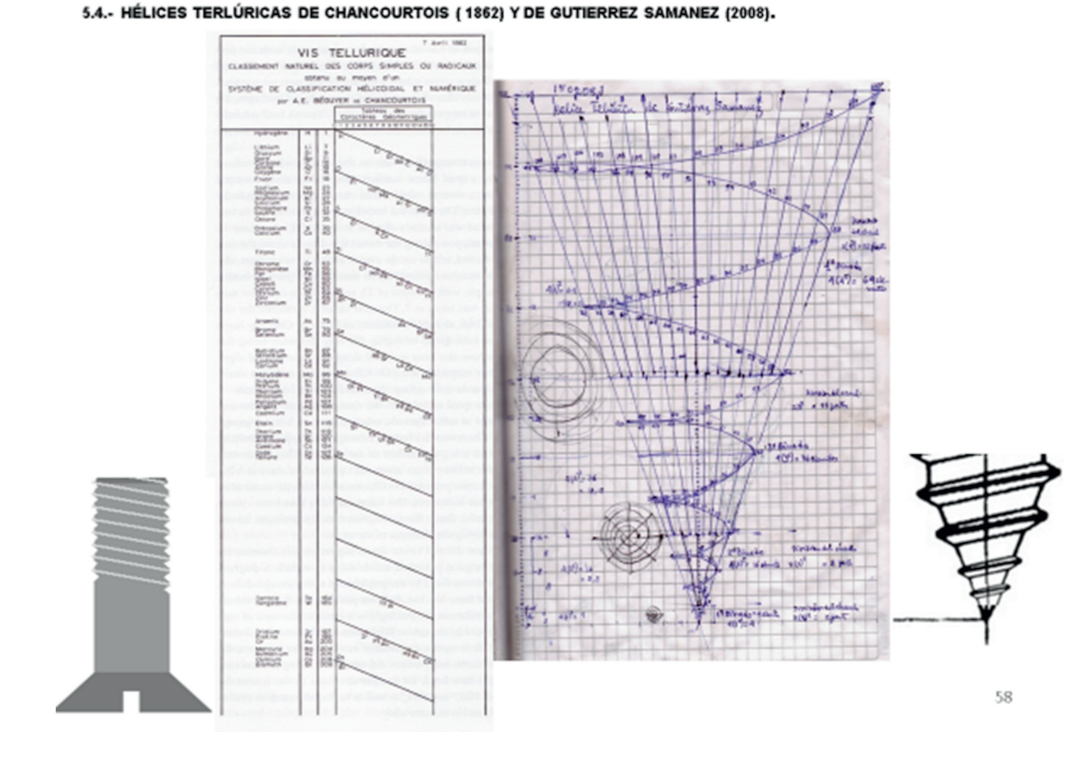
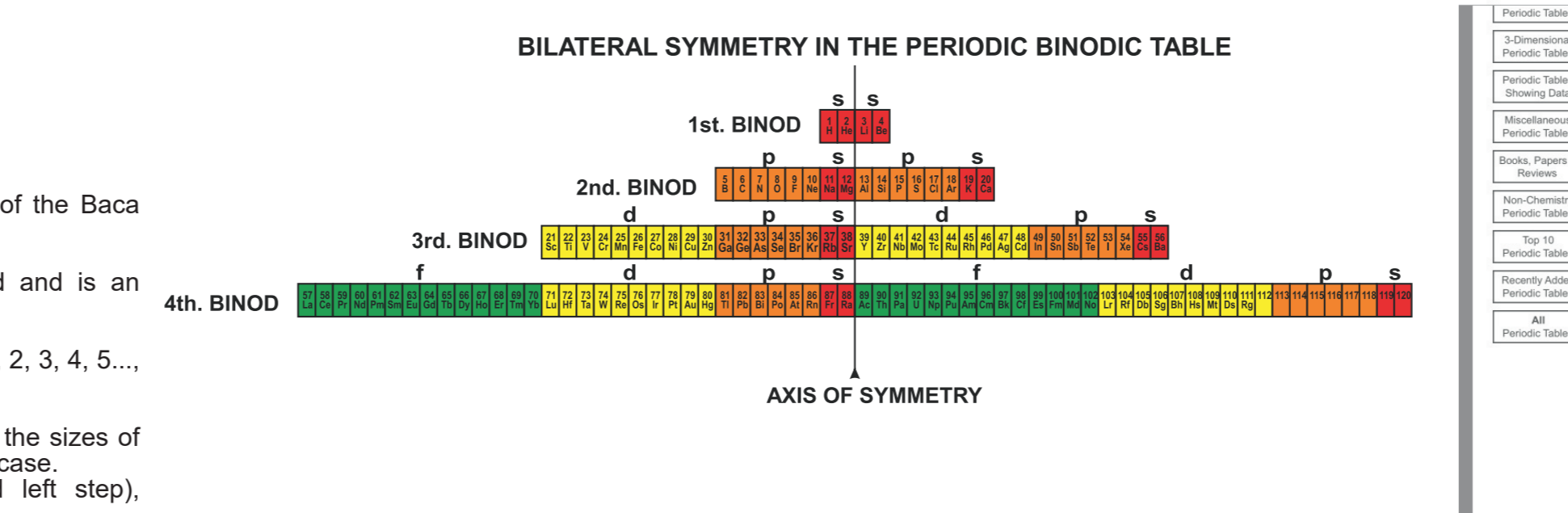
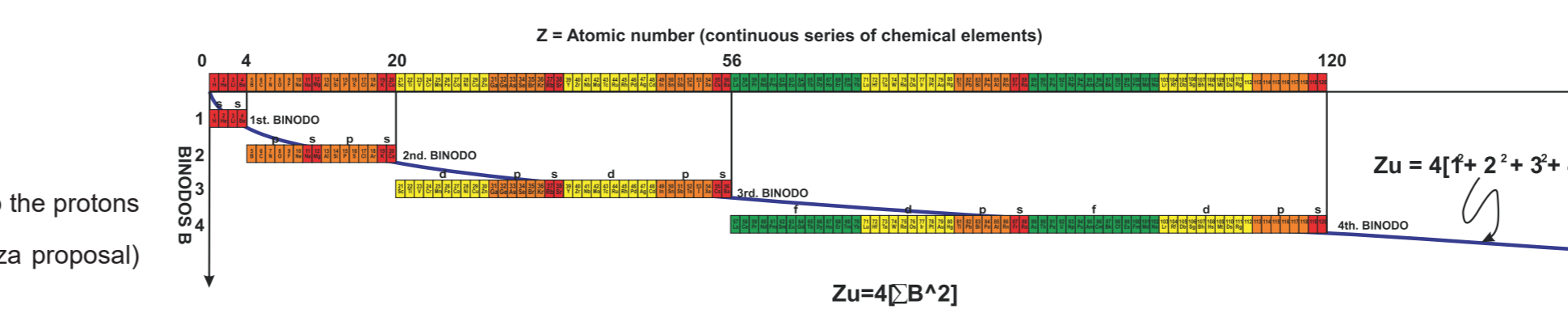
PERIODIC ARMONIC TABLE OF CHEMICAL ELEMENTS B - 2 SYSTEM
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Law of formation of nuclei (Horizontal or synchronic series)
 $Z = K + 1(n)$ para $n \leq -1$

Law of groups formation (Vertical or diachronic series)
 $Z_g = Z + [2(1 + 1 + 2^2 + 2^2 + 3^2 + 3^2 + 4^2 + 4^2 + 5^2 + 5^2 \dots)]$ para $Z \leq 0$

Law of limitation of periods
 $P = 2(1^2, 1^2, 2^2, 2^2, 3^2, 3^2, 4^2, 4^2, 5^2, 5^2, \dots)$

n	Z	1st Binodo	2nd Binodo	3rd Binodo	4th Binodo
1	-1				
2	1	H			
3	3	Li, Be	B, C, N, O, F, Ne		
4	11	Na, Mg	Al, Si, P, S, Cl, Ar	K, Ca	
5	19	K, Ca	Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn	Ga, Ge, As, Se, Br, Kr	Rb, Sr
6	37	Rb, Sr	Y, Zr, Nb, Mo, Tc, Ru, Rh, Pd, Ag, Cd	In, Sn, Sb, Te, I, Xe	Ba, La
7	55	Ba, La	Hf, Ta, W, Re, Os, Ir, Pt, Au, Hg	Tl, Pb, Bi, Po, At, Rn	Ra
8	87	Ra	Rf, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr	Ac, Th, Pa, U, Np, Pu, Am, Cm, Bk, Cf, Es, Fm, Md, No, Lr	



2018 Periodic System (Binodic Form): a new mathematical paradigm
By Julio Antonio Gutiérrez Samanez, who writes:
"System devised and prepared by the Peruvian chemical engineer, Julio Antonio Gutiérrez Samanez, deals with a new conception of Mendeleev's Law as a mathematical function and a new description of the process of forming the series of chemical elements according to mathematical laws and dialectical processes of changes quantitative and qualitative under a dynamic spiral architecture in 3D, which is postulated as a new scientific paradigm."

Periodical system (binodic form), n...
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