ARTICLE 06

FELIZ IV PLANET COUPLING: PROBABILITY CURVES NIN COUPLING FROM ORIGIN ELECTRON

Javier Silvestre (eeatom.blogspot com)

ABSTRACT

This is 6th article of 24 dedicated to atomic model based on Victoria equation (Articles index is at end). Fourth Feliz Solution is exposed to justify electron lobes magnitudes (z, MON or C_{POTI}) that can be in n principal quantum number by means of NIN (negative in negative) concept extension. First electron that exists in a new n principal quantum number has origin role with respect to other electrons that are later incorporated (P34) in this NIN concept extension. This origin electron is defined by electronic system that gives rise to other electronic systems of this same n number (P35 and P36).

Origin electron MON values are included in P37 and P38 with first relations between them and equation that allows to obtain MON for No Origin electrons is defined in P39.

Probability coefficient that relates two electrons is released (P42) and, together with MON (P39), z (P41) and C_{POTI} (P43) couplings, serve to Probability curves coupling.

KEYWORDS

Fourth Feliz Solution, NIN coupling, MON, Origin Electronic System (OES), Born Electronic System (BES), Victoria Equation.

INTRODUCTION

This is 6th article of 24 dedicated to atomic model based on Victoria equation (Articles index is at end). A extern electronic extreme (EE_A) is indicated with a suffix (r_A, H_A or c_A), B intern with b suffix (r_B, h_B or c_B) and i suffix is used to both electronic extremes (EE_i). All abbreviations are compiled at article end.

Electron conceived as two EE energetic equilibrium and expressed in introductory way using Victoria Equation [1], has been developing in three dimensions and in Probability concept [2-5]. First n energetic level electron (ns electron) must have its electronic system defined (Victoria Equation E_o and that being Ionization Energy is represented by IE (P03 [1]), charge (z), PEP, MON and C_{POTI}) including values justification (first those of origin electron and subsequently those of other electrons that arise from origin electron). In this article, ns electron is like planetary system star where planets are other electron lobes with same n that turn in c_i orbits as result of origin electron.

P34 Negative in Negative III: ns electron as origin of lobes in same n by curves coupling (First Part)

"P04 Inter-electron repulsion absence by negative charge saturation (NIN I)" [1] and "P23 Internal Electron conditions - Birth by Probability Coupling" [3] are extended with

this third part. P34 is indicated as "First Part" since "Second Part and close" is at article end.

First electron lobe that exists in a new n principal quantum number (ns) has origin role with respect to lobes of other electrons that are later incorporated. This origin role is based on probabilistic and geometric curves coupling between lobes. Overlap and coupling are used interchangeably.

P35 ns Origin Electronic System (OES)

OES outermost lobe is selected. External lobe of OES is constituted by: External Lobe, Initial Energy (E_o), z, MON, PEP and C_{POTI}.

In Lithium example [5], 2s Lithium has two lobes: one in n=2 and other in n=1 which is the most internal. OES is outermost and therefore OES is lobe in n=2. Lithium example data [5] are included in OES Table (**Table 1**). Indistinctly, Electronic System and lobe are to be used.

Table 1 - P35 ns Origin Electronic System (OES) data for outermost lobe of 2s Li electron		
Parámetro	**Valor**	**Comentario**
Atom	Lithium	
Electron	2s	
Lobe n	2	Outermost Lobe
E_o (eV) [6]	-5,391714761	IE as E_o by P03 [1]
z	1	Whole number according to P014 [1]
PEP	2	P025 [3]
MON (n=2)	25	P037.A. (In this article)
$C_{POTI-AL}$	]0, 3.1201231[	

P36 Born Electronic System (BES) from ns origin

Electrons that are not ns origin and have a lobe located in n, show that their BES values depend on OES values.

Lithium has not BES from 2s origin, but already Beryllium has one BES in n=2: $2s^2$. BES data are in **Table 2** where is indicated that parameters are obtained with its E_o (IE) and relations with OES values.

Table 2 - P36 Born Electronic System (BES) from ns origin	
Parámetro	**Comentario**
Atom	Beryllium
Electron	$2s^2$
Lobe n	n=2. Referenced to lobe in n=2 of 2s Be
E_o	IE as E_o by P03 [1]
PEP	PEP=2 (P025 [3])
MON	Calculated with its E_o and OES E_o (P37, P38 y P39)
z	Calculated with its E_o and OES E_o (P41)
C_{PEP}	Parameter used for probability coupling between two electronic systems (Generally, between BES and OES). Calculated with its E_o and OES E_o (P42)
$C_{POTI-AL}$	Approximate with its E_o and OES E_o (P43)

P37 OES MON

P37 has been subdivided considering Group to which OES belongs:

P37.A. OES MON in Group I (Alkali Metals)

ns Origin Electronic System MON (OES MON) decreases with n quantum number. Descent fulfils some numerical relations. Subsequently, all electronic parameters are implemented (including MON) with NIN rules that are summarized in P34 closing. But first, MON values are quoted for the Groups and, specifically at P37.A. is Group I OES MON (**Table 3**).

Table 3 – MON values for ns OES in Group I (Alkali Metals)						
n	1	2	3	4	5	6
MON	200	25	20	12,5	10	7,5

System MON values are fractions relative to n=2 MON (MON=25) which are listed in **Table 4**. Sum of fractions from n=3 to n=6 equals 2. Therefore, sum of MON in n=[3-6] is 50.

Table 4 – Alkali MON fractions: MON_{ns} / MON_{2s}					
n	3	4	5	6	Sum
Fraction with denominator=10	8/10	5/10	4/10	3/10	2

Hypothetical MON values (**Table 5**) are obtained if MON decreases for n>6 is continuation result of fractions with denominator=10. Assuming this hypothesis, sum of MON in n=[3,∞[interval equals 60 (1)

Table 5 - Hypothetical MON values in Alkali Metals for n>6						
n	7	8	9	10	8+n	Sum
Estimated MON	5	2,5	$2,5/2^1$	$2,5/2^2$	$2,5/2^n$	10
Fraction with denominator=10	2/10	1/10	$1/(10*2^1)$	$1/(10*2^2)$	$1/(10*2^n)$	4/10

$$(1) \sum_{n=3}^{\infty} (MON)_{ALKALI} = \sum_{n=3}^{6} (MON)_{ALKALI} + \sum_{n=7}^{\infty} (MON)_{ALKALI} = 50 + 10 = 60$$

P37.B. OES MON in Group II (Alkaline Earth Metals)

ns Origin Electronic System MON (OES MON) for Group II is equal to Group I OES MON half. OES MON for Group I and Group II is in **Table 6**

Table 6 – MON values for ns Systems in Group I (MON I) and II (MON II)						
n	1	2	3	4	5	6
MON I	200	25	20	12,5	10	7,5
MON II	100	12,5	10	6,25	5	3,75

P37.B. OES MON in Group XIII - XVIII (p-block)

ns Origin Electronic System MON (OES MON) for Groups XIII-XVIII is the same in all period and also OES MON decrease when n quantum number increases. Descent fulfils some numerical relations as seen previously in P37.A. OES MON for Groups I, II and XIII-XVIII are grouped in **Table 7**.

Two OES MON numerical relationships are:

a) $2p^x$ OES MON equals sum of np^x System from n=3 to n=6 (2).

$$(2)\ MON(2p^x) = MON(3p^x) + MON(4p^x) + MON(5p^x) + MON(6p^x)$$
$$10 = 4 + 3 + 2 + 1$$

Table 7 – ns OES MON (extern lobe in ns electrons)								
n	ns^1	Ns^2	np^1	np^2	np^3	np^4	np^5	np^6
2	25	12,5	10					
3	20	10	4					
4	12,5	6,25	3					
5	10	5	2					
6	7,5	3,75	1					

b) 60, that equals sum of MON in Group I (1), is obtained by multiplying 10 and 6 (3) and (4), where 6 is number of p-block groups.

$$(3) \sum_{n=2} (MON)_{GROUP\,XIII\,-\,XVIII} = 6(MON)_{2p^x} = 6 \cdot 10 = 60$$

$$(4) \sum_{n=3}^{6} (MON)_{GROUP\,XIII\,-\,XVIII} = 6\left[(MON)_{3p^x} + (MON)_{4p^x} + (MON)_{5p^x} + (MON)_{6p^x}\right] = 6 \cdot 10 = 60$$

Since last s consecutive electronic system ($2s^2$), three branches have sums equal to 60 (**Table 9**): 2s and ns^2 are not included in these three branches. Four branches have sums equal to 50 (**Table 10**): np^6 and last s consecutive system ($2s^2$) are outside these four branches.

Table 9 – Branches with sum of OES MON = 60								
n	ns^1	ns^2	np^1	np^2	np^3	np^4	np^5	np^6
2		last s consecutive	60					
3	60		60					
4								
5								
6								
∞								

Table 10 – Branches with sum of OES MON = 50								
n	ns^1	ns^2	np^1	np^2	np^3	np^4	np^5	np^6
2		last s consecutive	50					
3	50	50	50					
4								
5								
6								

P38 OES MON for internal OES

Internal OES maintains OES MON with which has its closed electron shell.

For example, 2s OES MON for p-block is 10. This 10 value is kept for this 2s OES MON in any atom posterior to Neon, starting with Sodium, where this 2s OES is already internal because one new electron shell has been opened (n=3).

P39 MON coupling

In general, two lobes in the same n quantum number couple their MON by means of their corresponding energies. Once known X lobe MON, Y lobe MON is given by (5) where non-excited electron energy is IE.

$$(5)\ \mathrm{MON(Y)} = \mathrm{MON(X)} \frac{(E_o)_X}{(E_o)_Y}$$

If X electron is origin electron (P35) and Y electron is born from origin (P36), (5) is transformed into (6) where B is Born and O is Origin.

$$(6)\ \mathrm{MON_B} = \mathrm{MON_O} \frac{(E_o)_O}{(E_o)_B}$$

Figure 1 has r_i vs. P_i curves of three electrons: 2s F with its OES MON (P37.C.), 2p^5 with same MON that 2s F (MON=10) and 2p^5 with MON coupling or BES MON. Electrons somewhat distant in energy have been selected to better observe difference between born electron with same MON that OES and with MON coupling. Nomenclature used has in brackets: (Symbol, Electron configuration, n). F 2p^5 MON calculation is in (7) with IE [6]. In this case, indicating its n is not necessary since 2p^5 can only be n=2. MON value obtained in (7) is used in [5] for Orbital representation and P_i vs. r_i

$$(7)\ \mathrm{MON_B}(F, 2p^5, 2) = \mathrm{MON_O} \frac{IE_O}{IE_B} = 10 \frac{-185.1868eV}{-17.42282eV} = 106.2897$$

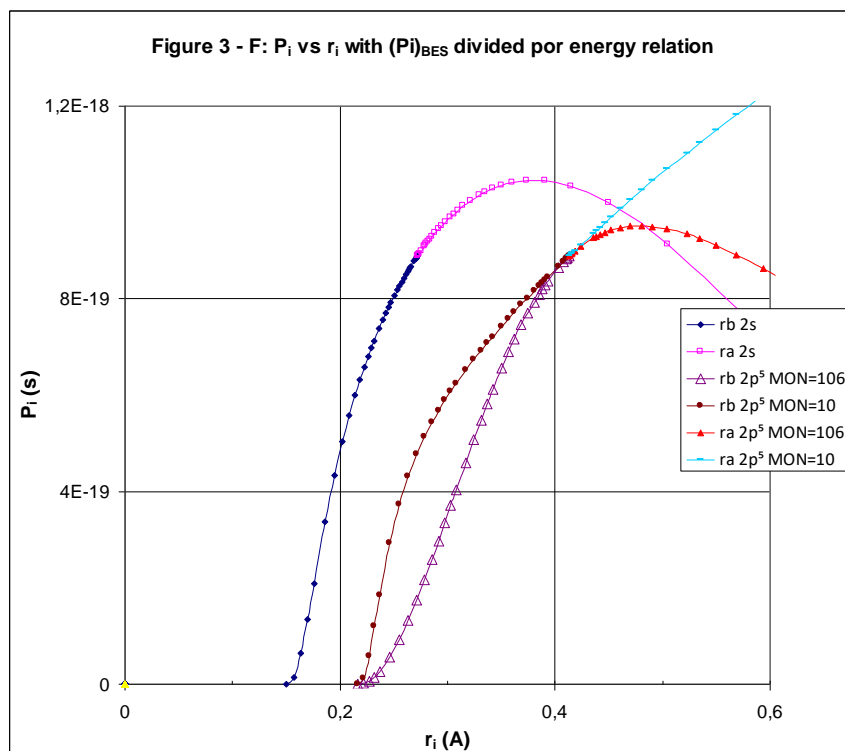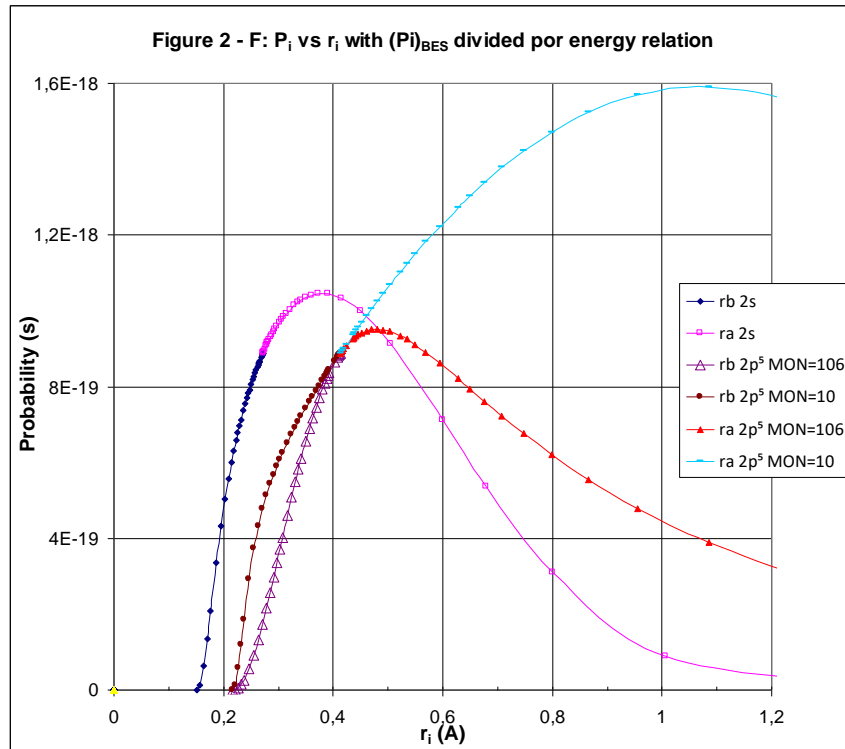Figure 1 - F: P_i vs. r_i for 2s OES (MON=10) and $2p^5$ with MON=10 and 106
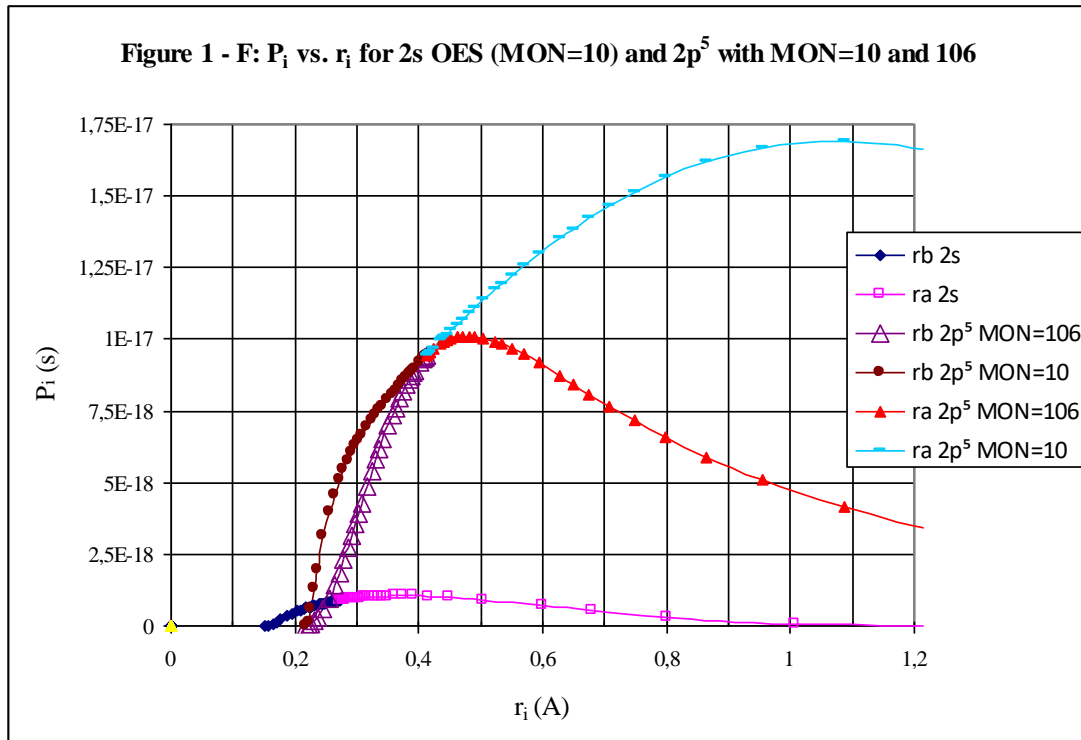
$2p^5$ P_i values are superior to those of 2s P_i because its IE is lower, but still, can be observed:

a) $2p^5$ P_i with MON coupling has morphology more similar to origin lobe P_i curve that $2p^5$ P_i curve with MON=10.

b) Two $2p^5$ lobe curves come together in the division→∞ surroundings because at that point, different MON has little influence.

c) Maximum $2p^5$ P_i with MON coupling (48 pm) is closer to maximum 2s P_i (38 pm) and in addition, 48 pm is in agreement with 40 pm [7] and 38 pm [8]. In contrast, if there is no MON coupling and MON (F, $2p^5$, 2)=10, Maximum probability is deflected to 110 pm. Maximum $2p^5$ P_i with MON coupling (48 pm) is not definitive since z coupling has not been considered.

In **Figure 2** and **Figure 3**, two $2p^5$ P_i curves have been divided by ratio between initial energies ($IE_O/IE_B = 10.62897$) to verify better morphology similarity between P_i curves indicated in Figure 1. In addition, the overlap of these two P_i curves is achieved if $2p^5$ lobe Pi curve with MON coupling is approached slightly towards nucleus by z coupling (P41). Morphology similarity and positive overlap do not occur with $2p^5$ lobe P_i curve without MON coupling

Figure 2 - F: P_i vs r_i with $(Pi)_{BES}$ divided por energy relation

Figure 3 - F: P_i vs r_i with $(Pi)_{BES}$ divided por energy relation

P40 Unique Energy Principle in all electron lobes

Energy initial (E_o or IE) from which lobe electrons are born is kept constant for all lobes.

For examples, $4s^2$ electron has same energy in its 4 lobes. In contrast, other magnitudes (charge (z), PEP, MON and C_{POTI}) which are intrinsically related to 4 OES , vary in each of 4 lobes.

P41 Electron charge (z) coupling

Origin lobe (ns electron external lobe) is governed by P14 [1]. Non-origin lobe (ns electron internal lobe and all born electron lobe) is controlled by P41 and its z coupling.

In general, two electrons couple their z following same path as MON coupling (P39), but with the inverted energetic radio (8). As in P39, If X electron is origin electron (P35) and Y electron is born from origin (P36), (8) is transformed into (9) where B is Born and O is Origin.

$$(8)\ z(Y) = z(X)\ \frac{(E_o)_Y}{(E_o)_X}$$

$$(9)\ z_B = z_O \left(\frac{(E_o)_B}{(E_o)_O} \right)$$

P42 C_{PEP} as adapted Probability between lobes pair

C_{PEP} (Probability electrons pair coefficient) is defined as coefficient that allows probability coupling between P_i curves of two electronic systems. The two coupled lobes are on the same n quantum number, but with different Electronic System parameters (P35 and P36).

Probability equation with Third Feliz Solution [5] is given by (10):

$$(10)\ P_i = \frac{\hbar}{2f \left(2 + \sum_{x=1}^{J} \frac{x^2 * P * M}{d^{x*P}} \right)} \frac{r_i C_{POTI}}{z}$$

Y lobe Probability (P_Y) calculated by (10), in terms of comparative curves with respect to X lobe Probability (P_X), is reformulated as $P_{Y\ to\ X}$ or P_y with respect to X lobe (11)

$$(11)\ P_{Y\ to\ X} = \frac{P_Y}{C_{PEP(Y\ to\ X)}}$$

Like MON (P39) and z (P41), C_{PEP} coupling can also be known by origin and born energy (12), being equally valid for any two lobes located on the same n (13):

$$(12)\ C_{PEP(B\ to\ O)} = \sqrt{\frac{(E_o)_O}{(E_o)_B}} \qquad \text{For } P_{B\ to\ O}\ (P_{BORN\ TO\ ORIGIN})$$

$$(13)\ C_{PEP(Y\,to\,X)} = \sqrt{\frac{(E_o)_X}{(E_o)_Y}} \qquad \text{For } P_{Y\,to\,X}$$

P43 C_{POTI} coupling

As seen in P39, P41 and P42, C_{POTI} coupling for Y and X is given by (14) and for Born and Origin by (15)

$$(14)\ C_{POTI\,-\,Y} = C_{POTI\,-\,X} \sqrt{\frac{(E_o)_Y}{(E_o)_X}}$$

$$(15)\ C_{POTI\,-\,B} = C_{POTI\,-\,O} \sqrt{\frac{(E_o)_B}{(E_o)_O}}$$

P34 Negative in Negative III: ns electron as origin of lobes in same n by curves coupling (Second Part and close)

NIN coupling can be achieved by PEP=2 and couplings of MON (P39), z (P41), C_{PEP} (P42) and C_{POTI} (P43).

MON coupling (P39) and z coupling (P41) are always between lobes located in the same quantum number and belong to different electrons. The reason is that MON(X) (5) or (6) and z(X) (8) or (9) are n functions.

C_{POTI} (P43) is different because is not n dependent (14) and (15), but for example its range and C_{POTI} that meets P31, P32 and P33 [5] are n dependent.

In contrast, C_{PEP} (P42) has no n influence since is only a energetic quotient, (12) and (13), and energy is unique in all electron lobes (P40). Therefore, C_{PEP} relationship between electrons pair is the same in all n quantum numbers.

NIN couplings are calculated using P39, P41, P42 and P43 and summarized in **Table 11**. In the same, and by way of example, C_{POTI} is worth 1. For its part, OES C_{PEP} is 1 because BES C_{PEP} is compared with respect to Origin System.

Table 11: NIN couplings in F n=2 between OES (2s) and BES ($2p^5$)						
Electronic System	Energy (eV) [6]	PEP	z	MON	C_{PEP}	C_{POTI}
2s	-185,1868	2	7	10	1	1
$2p^5$	-17,42282	2	0,6585769	106,2897	3,260211	0,3067285

There are two coupling types:

a) Geometric NIN Coupling (GNC)

Two Electronic Systems morphology is coupled by z, MON and C_{POTI}. That is, curves with geometric magnitudes in the representation are overlapped (**Figure 4** and **Figure 5**).

Figure 4 - 2s and $2p^5$ F: r_i vs c_i with GNC

Figure 5 - 2s and $2p^5$ F: r_i vs c_i with GNC
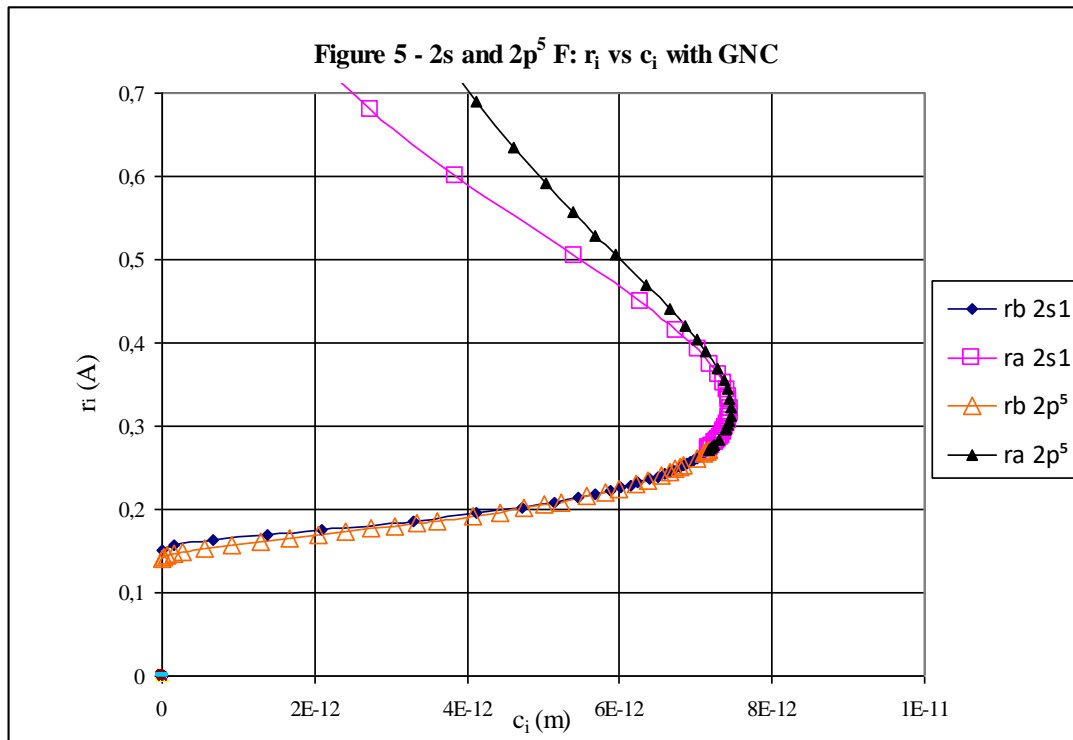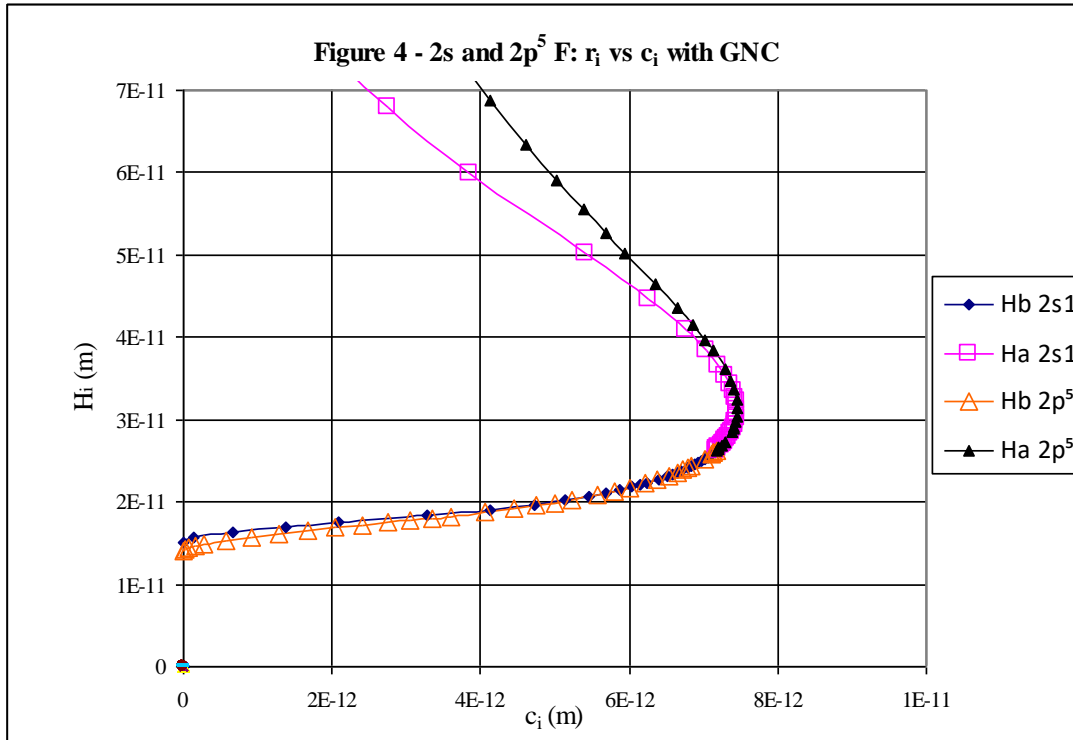
BES is located by z coupling in origin radial distance, while MON and C_{POTI} are decisive in form coupling. BES decreases z from 1 (Figure 3) to ≈0.66 (Table 11). As a consequence, $2p^5$ curve penetrates at distance closer to nucleus which allows curves to be radially in a position suitable for curves union. Thus, r_B is similar between both Electronic Systems (2s and $2p^5$) when d→0 in the inner EE_B (Figure 5) and, instead, there is r_B differential ≈8pm when $2p^5$ z is 1 (Figure 3).

In contrast, Probability curves are not overlapped considering what is seen in Geometric NIN Coupling (GNC) (**Figure 6**), although proportionality is observable in probability factor C_{PEP} absence.

b) Probabilistic NIN Coupling (PNC)

Electronic Systems with GNC achieve Probabilistic NIN Coupling (PNC) by C_{PEP} Coupling (P42). **Figure 6** is transformed in **Figure 7** by including C_{PEP} Coupling. Although simple and more precise method than the visual one is developed in next article, maximum electronic extremes Probability (Maximum Pi) is around 40 pm which is in agreement with 41 [7] and 38 [8] (**Figure 8** is zoom in Maximum Pi)
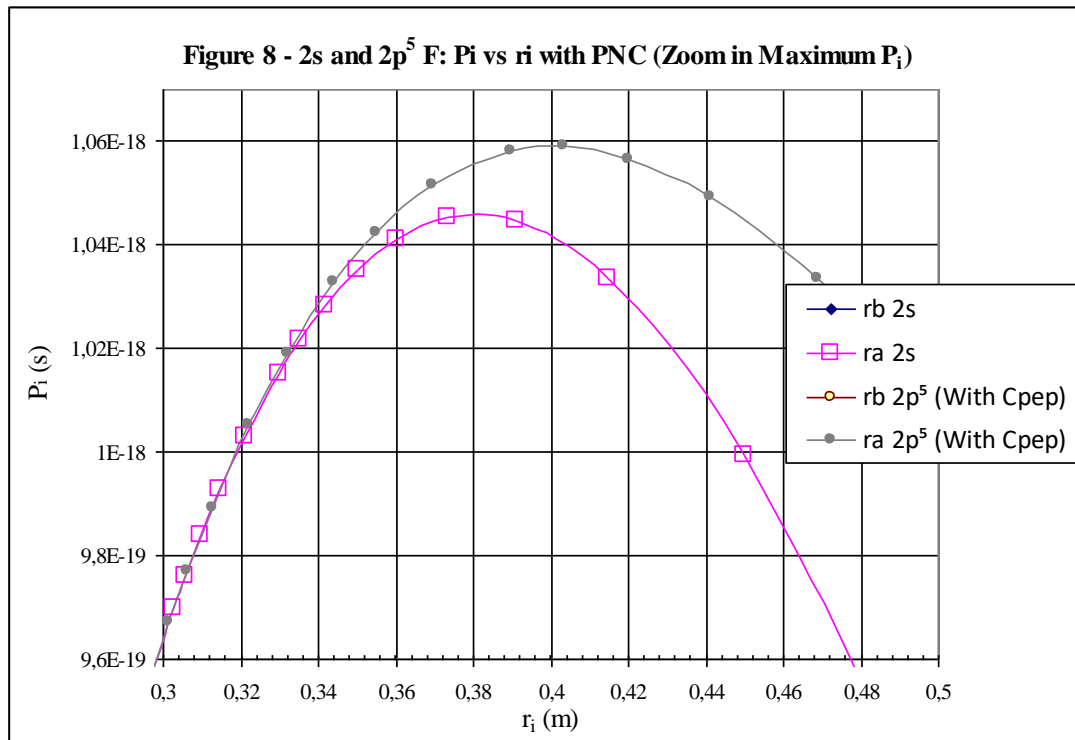
C_{PEP} (12) and C_{POTI} (15) have E_o ratio inverted and with same exponent equal to ½. This fact, together with C_{POTI} is in P_i numerator (10) and C_{PEP} divides P_i (11), suggest a coupling of both factors (16). Except C_{POTI}, the rest of (10) has been abbreviated as A (18). C_{POTI} is indicated as C_{POTI-Y} because comes from P_Y and thus is differentiated from C_{POTI-X} After developing (16) is verified that P_Y relative to P_X is proportional to its $(E_o)_Y$ and X Electronic System C_{POTI} (C_{POTI-X}) and inversely proportional to $(E_o)_X$. (17) starts from end of (16) and expands it by including A formula (18). Abbreviated intermediate form is performed by substituting C_{MON} (C_{MON} is C_F part as is defined in [5])

$$(16) \; P_{Y \, to \, X} = \frac{P_Y}{C_{PEP(Y \, to \, X)}} = A \frac{C_{POTI-Y}}{C_{PEP(Y \, to \, X)}} = A \frac{C_{POTI-X} \left(\frac{(E_o)_Y}{(E_o)_X} \right)^{1/2}}{\left(\frac{(E_o)_X}{(E_o)_Y} \right)^{1/2}} = A C_{POTI-X} \frac{(E_o)_Y}{(E_o)_X}$$

$$(17) \; P_{B \, to \, O} = \frac{\hbar}{2f \left(2 + \sum_{x=1}^{J} \frac{x^2 * P * M}{d^{x*P}} \right)} \frac{r_i}{z} \frac{(E_o)_B}{(E_o)_O} C_{POTI-O} = \frac{\hbar}{2f C_{MON}} \frac{r_i}{z} \frac{(E_o)_B}{(E_o)_O} C_{POTI-O}$$

$$(18) \; A = \frac{\hbar}{2f \left(2 + \sum_{x=1}^{J} \frac{x^2 * P * M}{d^{x*P}} \right)} \frac{r_i}{z}$$

Figure 6 - 2s and 2p^5 F: P$_i$ vs r$_i$ with GNC and without PNC

Figure 7 - 2s and 2p^5 F: Pi vs ri with or without PNC

Figure 8 - 2s and 2p^5 F: Pi vs ri with PNC (Zoom in Maximum P$_i$)
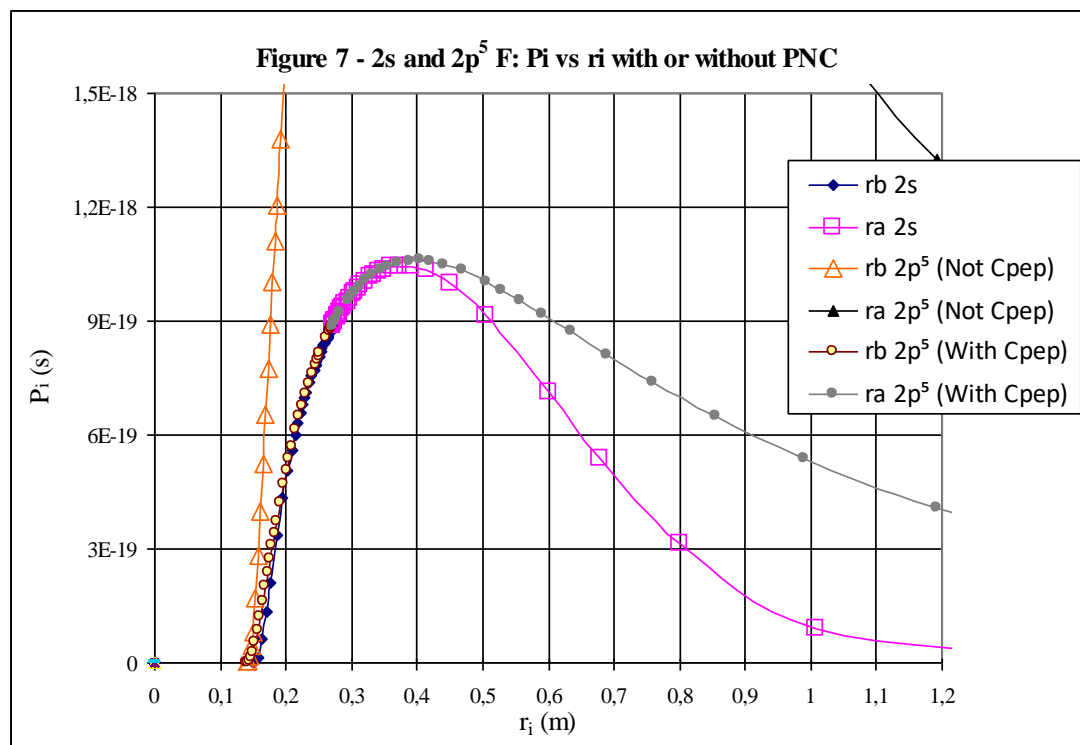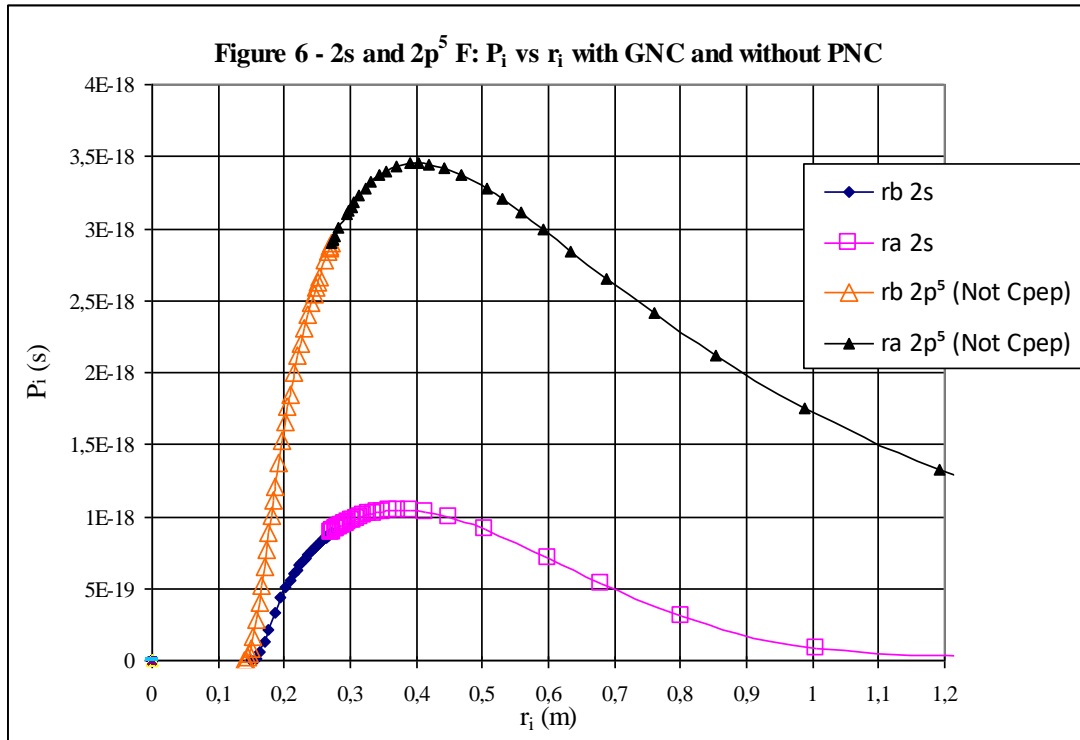
BIBLIGRAPHY

[1] Javier Silvestre. Victoria Equation - The dark side of the electron. (Document sent to vixra.org)

[2] Javier Silvestre. Electronic extremes: orbital and spin (introduction). (Document sent to vixra.org)

[3] Javier Silvestre. Relations between electronic extremes: Rotation time as probability and First Feliz Solution. (Document sent to vixra.org)

[4] Javier Silvestre. Feliz II the prudent: Probability radial closure with high order variable C$_F$. (Document sent to vixra.org)

[5] Javier Silvestre. Feliz III The King Major: Orbital filled keeping Probability electronic distribution. (Document sent to vixra.org)

[6] Kramida, A., Ralchenko, Yu., Reader, J., and NIST ASD Team (2014). NIST Atomic Spectra Database (ver. 5.2), [Online]. Available: http://physics.nist.gov/asd

[7] S. Fraga, J. Karwowski, K. M. S. Saxena, Handbook of Atomic Data, Elsevier, Amsterdam, 1979.

[8] Desclaux JP. Relativistic Dirac-Fock expectation values for atoms with Z = 1 to Z = 120. Atom Data Nucl Data Tables 1973;12: 311-406.

Abbreviations List

Suffix indicates electronic extreme considered and i suffix is used to both electronic extremes (EE_i). Following Table indicates abbreviations used in this theory and its use in article in question is marked with X. 6 is present article. Jump from "Article 09" to "Article 20" is consequence of second part inclusion.

Abbreviations Table						
Abbreviation	**6**	**7**	**8**	**9**	**20**	**Meaning**
α_{NOA}		X				Nucleus-Orbit-Angle
a_o						Bohr radius
AL						Angular Limit
BES	X	X	X	X		Born Electronic System
c_i	X	X	X	X		EE Orbital circumference
C_F	X		X	X		Wavelength compaction factor
C_{MON}	X	X				C_F without C_{POTI}
C_{PEP}	X	X	X	X		Probability electrons pair coefficient
C_{POTI}	X	X	X	X		Probabilistic Orbital Tide in Third Feliz Solution
$C_{POTI-AL}$		X	X	X		C_{POTI} Angular Limit
$C_{POTI-GAL}$			X			C_{POTI} Geometric Angular Limit
$C_{POTI-LAG}$			X			C_{POTI} Lobe always growing
d	X	X	X	X		Birth wavelength division or simply, division
EE	X	X	X	X		Electronic extreme
E_o	X	X	X	X		Initial, birth or output energy
E_i			X			EE energy
Ek_i						EE kinetic energy
EP_i						EE potential energy
ES						Equi-energetic state
f	X					Constant in Victoria Equation
F		X				Constant f multiplied by z
GAL						Geometric Angular Limit
GNC	X	X	X	X		Geometric NIN Coupling
h						Planck´s constant
$\hbar$	X		X			Reduced Planck´s constant
h_i						Planck´s constant adapted to EE
H_i	X	X	X	X		EE Circular orbit height
IE	X	X	X	X		Ionization Energy
m_e			X			Electron mass

m_i					EE mass
J	X				C_F order in Second Feliz Solution (From x=1 to J)
K_P					Probability constant in Variable C_F
λ_{Birth} λ		X	X		Birth wavelength
λ_c					Electron classic wavelength
λ_i					EE wavelength
$\lambda_{i-Birth}$					EE wavelength when $d \to \infty$
M	X				MON (Modified Orbital Number)
MON	X	X	X	X	Modified Orbital Number
NIN	X	X	X	X	Negative in Negative (Electron in electron concept)
OAM					Orbital Angular Momentum
OES	X	X	X	X	Origin Electronic System
OPA			X		Orbital Planes Axis
P_i	X	X	X	X	EE Probability
P	X				PEP (Principal Electronic Part)
PEP	X				Principal Electronic Part
PNC	X	X	X	X	Probabilistic NIN Coupling
$P_{Y\ to\ X}$	X				P_y with respect to X lobe
q_e					Electron charge
q_i					EE charge
q_{ip}					Proton charge
r_{AB}					Difference in nucleus distance between EE_A and EE_B
r_O					Nucleus distance when EE_i is in pivot or initial position
r_i	X	X	X	X	Distance between nucleus and EE
SAM					Spin Angular Momentum
SMM					Spin Magnetic Momentum
SSM					Secondary Swinging Movement
v_i			X		EE velocity
z	X	X	X	X	Effective nuclear charge
Z		X	X		Atomic number