Electron Binding Energies in the Aether Physics Model

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Abstract

Our previous papers and book explain the essentials of the Aether Physics Model in sufficient detail. In this paper, we show the Aether Physics Model's structure and logic for deriving a complete-periodic-table ground state electron binding energy equation. There remains a very small arbitrarily induced quantity in the present formulation, but we are confident a physical quantity will soon replace it. This paper demonstrates the capacity for significant progress in understanding quantum structure and quantum mechanics using a completely new quantum paradigm.

1. Introduction

Scientists have attempted to quantify the electron binding energies of atoms. Lindgren[i] reports on probabilistic methods for deriving the electron binding energies using the Koopmans Theorem, ΔSCF, many-body perturbation (MBPT), Coupled-Cluster Approach (CCA), Greene's function, and the density functional theory (DFT) approach. Whitney[ii][iii] uses a new two-step variant of special relativity theory to uncover an underlying similarity between all elements and Hydrogen, and algebraically characterizes all variations from that norm. The present work bases on a new discrete physical model for quantum structure, and results directly in an accurate binding energy equation predicting all ground state electrons.

The Aether Physics Model is a discrete model of quantum structure. Up to now, the Aether Physics Model only quantified quantum *structure*, as opposed to quantum *mechanics*. Despite the properly quantified Unified Force Theory contained within the Aether Physics Model, the model has not yet received significant attention from physicists and mathematicians. This lack of interest is partly due to the necessity of learning revised definitions for the dimensions, understanding that electrical units should always be expressed in dimensions of distributed charge (charge squared), and understanding the two distinctly different manifestations of charges. Further, the Aether Physics Model is a paradigm of Aether/angular momentum, as opposed to the mass/energy paradigm presently in use.

The significance of the Aether/angular momentum paradigm is that it shows the relationship between environment (Aether) and matter (angular momentum). The environment and matter quantify geometrically, as well as with dimensions and values. The geometrical quantification of Aether and matter allows for a discrete understanding of quantum structure in five dimensions (three dimensions of length, two dimensions of frequency), and a more precise understanding of charges and their mechanics.

The discrete and precise quantum structures allow for the development of the electron binding energy equations. We will lead the reader through each step of the process, but assume some familiarity with our white paper[iv] and book[v], which provide the foundation for the Aether Physics Model.

For the reader's convenience, Table 1 includes the essential values and dimensions for the calculations.

Table 1. Essential Constants					
Constant	Symbol	Value	Constant	Symbol	Value
Aether Unit	A_u	$1.419 \times 10^{12} \frac{kg \cdot m^3}{sec^2 \cdot coul^2}$	Electron Strong Charge	e_{emax}^2	$1.400 \times 10^{-37} coul^2$
Quantum Length (Compton wavelength)	λ_C	$2.426 \times 10^{-12} m$	Classical Electron Radius	r_e	$2.818 \times 10^{-15} m$
Quantum Frequency	F_q	$1.236 \times 10^{20} Hz$	Bohr Electron Radius	α_0	$5.292 \times 10^{-11} m$
Speed of Light	c	$2.998 \times 10^8 \frac{m}{sec}$	Planck's Constant	h	$6.626 \times 10^{-34} \frac{kg \cdot m^2}{sec}$
Mass of Electron	m_e	$9.109 \times 10^{-31} kg$	Electron Fine Structure Constant	α	7.297×10^{-3}

Unique to the Aether Physics Model is a new system of quantum measurement units. The quantum measurement units contain both dimensions and quantum values. Except where the quantum measurement already defines in modern physics, a four-letter acronym represents each unit. This new notation necessarily differentiates the new unit system from other systems.

2. Strong Force of the Electron

In our paper, A New Foundation for Physics[vi], we demonstrate the Casimir equation is actually a form of the strong force equation for the electron.

$$\frac{\pi \cdot h \cdot c}{480 \cdot \lambda_C{}^4} \lambda_C{}^2 \approx A_u \frac{e_{emax}{}^2}{\lambda_C{}^2} \tag{2.1}$$

The slight difference in value is consistent with the Casimir effect experiment by Steven Lamoreaux[vii].

Since quantum structure composes from quantum measurements, and the Compton wavelength empirically demonstrates as the quantum length, we can determine the quantum energy of an electron during one cycle of the quantum frequency (the duration of one cycle of quantum frequency is a quantum moment) is equal to:

$$enrg = A_u \frac{e_{emax}{}^2}{\lambda_C} \tag{2.2}$$

Interestingly enough, the quantum energy of the electron is also equal to the mass of the electron times the speed of light squared:

$$enrg = m_e \cdot c^2 \tag{2.3}$$

However, mass is not matter and no physical meaning is attributed to "velocity squared," therefore there is no physical interpretation for mass times velocity squared in the Standard Model. In the Aether Physics Model, we discretely define quantum energy as the Aether (environment) imparting a quantum strong force through the electron over a range of one quantum length.

Although the electrons are bound to the nucleus due to electrostatic attraction, almost all the binding energy action takes place because of the strong force between electrons.

3. Meaning of Kinetic Energy

All energy transactions occur in two parts. There is the source of the energy and there is the receiver of the energy. To put it in common language, there is cause and effect. Whether an electron is seen being acted upon, or doing the acting, it is only half the energy transaction. Therefore, the binding energy equation will represent only half the energy transaction. Our book, Secrets of the Aether[viii], explains the two-part energy transaction in detail.

4. Toroidal Structure of the Electron

While researching the evidence for electron radii, we came upon the research of David McCutcheon and his Ultrawave Theory[ix], which gave an interesting view of the classical and Bohr electron radii:

$$2\pi r_e \cdot 2\pi\alpha_0 = \lambda_C{}^2 \tag{4.1}$$

It is likely others have noticed this relationship, but such work was not located. The above relationship reveals that a toroid with a minor radius equal to the classical electron radius and major radius equal to the Bohr radius has the surface area equal to the Compton wavelength squared.

Further, Planck's constant easily demonstrates the quantum of action (for the electron) is equal to the mass of the electron times the Compton wavelength squared times the quantum frequency.

$$h = m_e \cdot \lambda_C{}^2 \cdot F_q \tag{4.2}$$

We used the above quantum analyses in developing the Aether Physics Model. It turns out the electron models as a toroid, which can have variable radii as long as the quantum surface area remains the same. Therefore, the electron is not a fixed-point particle, but is a flexible toroidal entity. The flexibility is possible due to the Aether, which gives the electron its structure. As detailed in Secrets of the Aether[x], the Aether is a quantum unit of rotating magnetic field. Ontologically, the Aether unit pre-exists matter and contributes to the material structure of the angular momentum encapsulated by it.

5. Hydrogen Electron Binding Energy

Because of the relationship between the classical and Bohr electron radii, the proportion of the two is equal to the electron fine structure constant squared.

$$\frac{r_e}{\alpha_0} = \alpha^2 \tag{5.1}$$

An equation, once posted on a Vanderbilt University philosophy page[xi], and by David McCutcheon, expressed the hydrogen 1s (ground state) orbital electron in terms of the electron fine structure and kinetic energy of the electron:

$$H_{1s} = \alpha^2 \frac{m_e \cdot c^2}{2} = 13.606 eV \tag{5.2}$$

In the Aether Physics Model, this would interpret as the ground state, unbound ratio of the electron radii times the strong force of the electron at the range of one quantum length:

$$H_{1s} = \frac{r_e}{\alpha_0} A_u \frac{e_{emax}{}^2}{2\lambda_C} = 13.606 eV \tag{5.3}$$

(Electron volts express energy above, although the same value written in quantum measurements units is $2.663 \times 10^{-5} enrg$.)

6. Helium Electron Binding Energy

Due to the nature of curved Aether (space-time), when multiplying charges the square root of each charge is used. If there are two electron strong charges involved, then the strong force between them is equal to:

$$A_u \frac{2e_{emax} \cdot 2e_{emax}}{\lambda_C{}^2} = F \tag{6.1}$$

We could similarly calculate the kinetic energy as:

$$A_u \frac{2e_{emax} \cdot 2e_{emax}}{2\lambda_C} = E_k \tag{6.2}$$

In our book, Secrets of the Aether, we have a section about Aether Structures[xii]. The steps involved in building Aether structures involve quantifying the spin differences of matter and Aether. Although the quantum Aether unit has 2-spin, subatomic particles only inhabit one fourth of the Aether, or half spin.

The "spin" of the subatomic particles is a direct result of the two dynamic frequency dimensions of the Aether. One of the dynamic frequency dimensions manifests as forward/backward time, the other manifests as right/left spin direction. There is actually a third "static" frequency, which results in positive/negative electrostatic charge.

All matter in our observed Universe exists in only the forward time direction. This observed matter further divides into matter and antimatter, depending on which half of the spin *direction* cycle it exists. Matter also divides into positive and negative charge depending on which half of the static charge cycle it exists.

The primary angular momentum composing subatomic particles can only spin in either the forward or backward time direction, and either the right or left spin direction, and exist in either the positive or the negative of the static charge dipole. Since static charge is not part of the dynamic two-spin structure of the Aether, and angular momentum only exists in half the forward/backward time frequency and half the right/left spin direction, matter appears to have half-spin.

Therefore, when half spin subatomic particles bind they are missing the backward time direction, yet the Aether sees this backward time direction. The result is that subatomic particles do not pair exactly opposite or adjacent to each other, as square building blocks seem to do at the macro level of existence. Instead, the subatomic particles (being curved toroidal structures to begin with), build up in a twisted pattern.

This twisted construction affects the minor and major radii of the toroidal electrons. As electrons bind to each other and fill the Aether spin positions around an atomic nucleus, the effect is additive.

In the case of the electrons, the minor radius increases with the number of electrons (which is equal to the number of protons in a neutral atom). Designating the number of protons as Z, the minor radius decreases in steps of half spin.

$$\frac{\sqrt{Z^2+1}-1}{2} \tag{6.3}$$

The major radius increases in steps of half spin:

$$\frac{\sqrt{Z^2+1}+1}{2} \tag{6.4}$$

The above stepping patterns are the phi and Phi numbers. In the case of the first binding, where there are two electrons, we get:

$$\frac{\sqrt{2^2+1}-1}{2} = phi = .618...$$

$$\frac{\sqrt{2^2+1}+1}{2} = Phi = 1.618...$$

(6.5)

The above numbers are the Golden Ratio (*Phi*) and its reciprocal (*phi*).

With the increase in the number of protons in the atoms, there is an increase in the number of electrons. The total electron radii deform accordingly. As the minor radius shrinks and the major radius grows, there is a deformation as the Aether units stretch and thus the distance between them shrinks. The distance empirically induces in terms of the quantum length as (the nth root is a capital Z squared):

$$\frac{\lambda_C}{\sqrt[Z^2]{2}}$$

(6.6)

There is no electron strong force binding in the neutral hydrogen atom because there is only one electron, but when we look at helium and all other neutral atoms, the electron binding energy equation for the 1s "orbital" electron becomes:

$$Z_{1s} = \frac{r_e \frac{\sqrt{Z^2+1}-1}{2}}{\alpha_0 \frac{\sqrt{Z^2+1}+1}{2}} A_u \frac{Z \cdot e_{emax} \cdot Z \cdot e_{emax} \cdot \sqrt[Z^2]{2}}{2\lambda_C}$$

(6.7)

In the case of the neutral helium atom, we can calculate the 1s orbital electron binding energies as:

$$He_{1s} = \frac{r_e \frac{\sqrt{2^2+1}-1}{2}}{\alpha_0 \frac{\sqrt{2^2+1}+1}{2}} A_u \frac{2 \cdot e_{emax} \cdot 2 \cdot e_{emax} \cdot \sqrt[2^2]{2}}{2\lambda_C} = 24.721 eV$$

(6.8)

The empirically measured 1s "orbital" electron binding energy for helium is 24.6eV.

7. Lithium and All Other Binding Energies

As the bindings continue into complexity, it is clear another factor comes into play, which does not yet properly quantify. The elements lithium through neon comprise the second orbital layer around the nucleus. It may just be coincidence, but these eight out of the first ten elements calculate to eight tenths of their measured values. From sodium to uranium, the calculation variations are linear with respect to the measured electron binding energies indicating a simple physical explanation.

When a linear adjustment applies to the equation, the calculations are remarkably close to the measured values:

$$Z_{1s} = \frac{r_e \dfrac{\sqrt{Z^2+1}-1}{2}}{\alpha_0 \dfrac{\sqrt{Z^2+1}+1}{2}} A_u \frac{Z \cdot e_{emax} \cdot Z \cdot e_{emax} \cdot \sqrt[Z^2]{2} \cdot (.757+.0028Z)}{2\lambda_C} \tag{7.1}$$

The above equation may be simplified, but it remains in its present form to remind the reader of its physical interpretation. The empirical data used in this paper draws from Gwyn Williams'[xiii] compilation of electron binding energies. Table 2 shows the measured and calculated 1s orbital binding energies in eV per atomic element and the deviation between them based upon equation 7.1. Figure 1 depicts the deviation of the calculations from the empirically measured electron binding energies of the 1s orbital position for each element for equation 7.1.

Table 3 lists the measured 1s orbital binding energies in eV per atomic element in comparison to the calculations of equation 6.8 (without the linear adjustment). Figure 2 shows the deviation of the unadjusted (equation 6.8) calculations from the empirical electron binding energies of the 1s orbital positions for each atomic element. The unadjusted data presents for those interested in discovering the final physical component of the 1s orbital binding energy equation.

Table 2 – Empirical and Calculated Binding Energies with Errors (equation 7.1)

Z	Element	Measured	Calculated	Deviation	Z	Element	Measured	Calculated	Deviation
3	Li	54.7	52.59	4.02%	48	Cd	26711	26810.90	-0.37%
4	Be	111.5	106.46	4.74%	49	In	27940	28050.92	-0.40%
5	B	188	181.21	3.75%	50	Sn	29200	29322.58	-0.42%
6	C	284.2	277.27	2.50%	51	Sb	30491	30626.12	-0.44%
7	N	409.9	394.99	3.77%	52	Te	31814	31961.76	-0.46%
8	O	543.1	534.65	1.58%	53	I	33169	33329.73	-0.48%
9	F	696.7	696.51	0.03%	54	Xe	34561	34730.27	-0.49%
10	Ne	870.2	880.82	-1.21%	55	Cs	35985	36163.59	-0.49%
11	Na	1070.8	1087.81	-1.56%	56	Ba	37441	37629.93	-0.50%
12	Mg	1303	1317.74	-1.12%	57	La	38925	39129.52	-0.52%
13	Al	1559	1570.84	-0.75%	58	Ce	40443	40662.58	-0.54%
14	Si	1839	1847.33	-0.45%	59	Pr	41991	42229.35	-0.56%
15	P	2145.5	2147.45	-0.09%	60	Nd	43569	43830.05	-0.60%
16	S	2472	2471.44	0.02%	61	Pm	45184	45464.91	-0.62%
17	Cl	2822	2819.52	0.09%	62	Sm	46834	47134.16	-0.64%
18	Ar	3205.9	3191.92	0.44%	63	Eu	48519	48838.03	-0.65%
19	K	3608.4	3588.88	0.54%	64	Gd	50239	50576.74	-0.67%
20	Ca	4038.5	4010.62	0.70%	65	Tb	51996	52350.53	-0.68%
21	Sc	4492	4457.37	0.78%	66	Dy	53789	54159.62	-0.68%
22	Ti	4966	4929.37	0.74%	67	Ho	55618	56004.25	-0.69%
23	V	5465	5426.83	0.70%	68	Er	57486	57884.64	-0.69%
24	Cr	5989	5950.00	0.66%	69	Tm	59390	59801.01	-0.69%
25	Mn	6539	6499.09	0.61%	70	Yb	61332	61753.61	-0.68%
26	Fe	7112	7074.35	0.53%	71	Lu	63314	63742.65	-0.67%
27	Co	7709	7675.99	0.43%	72	Hf	65351	65768.37	-0.63%
28	Ni	8333	8304.24	0.35%	73	Ta	67416	67830.99	-0.61%
29	Cu	8979	8959.34	0.22%	74	W	69525	69930.74	-0.58%
30	Zn	9659	9641.52	0.18%	75	Re	71676	72067.85	-0.54%
31	Ga	10367	10350.99	0.15%	76	Os	73871	74242.56	-0.50%
32	Ge	11103	11088.00	0.14%	77	Ir	76111	76455.08	-0.45%
33	As	11867	11852.76	0.12%	78	Pt	78395	78705.65	-0.39%
34	Se	12658	12645.52	0.10%	79	Au	80725	80994.49	-0.33%
35	Br	13474	13466.49	0.06%	80	Hg	83102	83321.84	-0.26%
36	Kr	14326	14315.91	0.07%	81	Tl	85530	85687.92	-0.18%
37	Rb	15200	15194.00	0.04%	82	Pb	88005	88092.96	-0.10%
38	Sr	16105	16100.99	0.02%	83	Bi	90526	90537.19	-0.01%
39	Y	17038	17037.12	0.01%	84	Po	93105	93020.84	0.09%
40	Zr	17998	18002.61	-0.03%	85	At	95730	95544.14	0.19%
41	Nb	18986	18997.68	-0.06%	86	Rn	98404	98107.31	0.30%
42	Mo	20000	20022.57	-0.11%	87	Fr	101137	100710.59	0.42%
43	Tc	21044	21077.51	-0.16%	88	Ra	103922	103354.20	0.55%
44	Ru	22117	22162.73	-0.21%	89	Ac	106755	106038.37	0.68%
45	Rh	23220	23278.44	-0.25%	90	Th	109651	108763.32	0.82%
46	Pd	24350	24424.89	-0.31%	91	Pa	112601	111529.30	0.96%
47	Ag	25514	25602.30	-0.34%	92	U	115606	114336.53	1.11%

Values calculated in Microsoft Excel

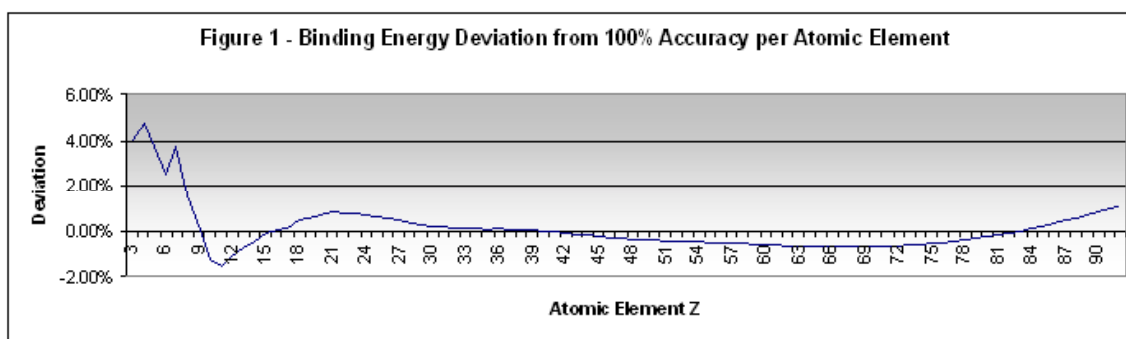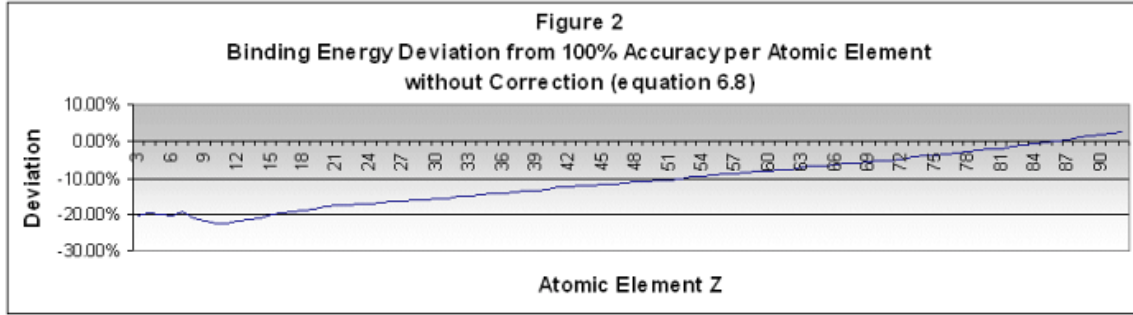Figure 1 - Binding Energy Deviation from 100% Accuracy per Atomic Element

Table 3 - Empirical and Calculated Binding Energies with Errors (equation 6.8) via MS Excel

Z	Element	Measured	Calculated	Deviation	Z	Element	Measured	Calculated	Deviation
3	Li	54.7	68.71	-20.38%	48	Cd	26711	30077.29	-11.19%
4	Be	111.5	138.58	-19.54%	49	In	27940	31369.85	-10.93%
5	B	188	235.03	-20.01%	50	Sn	29200	32689.61	-10.67%
6	C	284.2	358.33	-20.69%	51	Sb	30491	34036.58	-10.42%
7	N	409.9	508.62	-19.41%	52	Te	31814	35410.77	-10.16%
8	O	543.1	685.98	-20.83%	53	I	33169	36812.16	-9.90%
9	F	696.7	890.45	-21.76%	54	Xe	34561	38240.77	-9.62%
10	Ne	870.2	1122.06	-22.45%	55	Cs	35985	39696.59	-9.35%
11	Na	1070.8	1380.83	-22.45%	56	Ba	37441	41179.61	-9.08%
12	Mg	1303	1666.76	-21.82%	57	La	38925	42689.85	-8.82%
13	Al	1559	1979.88	-21.26%	58	Ce	40443	44227.30	-8.56%
14	Si	1839	2320.18	-20.74%	59	Pr	41991	45791.96	-8.30%
15	P	2145.5	2687.68	-20.17%	60	Nd	43569	47383.84	-8.05%
16	S	2472	3082.37	-19.80%	61	Pm	45184	49002.92	-7.79%
17	Cl	2822	3504.25	-19.47%	62	Sm	46834	50649.21	-7.53%
18	Ar	3205.9	3953.34	-18.91%	63	Eu	48519	52322.72	-7.27%
19	K	3608.4	4429.62	-18.54%	64	Gd	50239	54023.44	-7.01%
20	Ca	4038.5	4933.11	-18.13%	65	Tb	51996	55751.36	-6.74%
21	Sc	4492	5463.81	-17.79%	66	Dy	53789	57506.50	-6.46%
22	Ti	4966	6021.71	-17.53%	67	Ho	55618	59288.85	-6.19%
23	V	5465	6606.81	-17.28%	68	Er	57486	61098.41	-5.91%
24	Cr	5989	7219.12	-17.04%	69	Tm	59390	62935.19	-5.63%
25	Mn	6539	7858.64	-16.79%	70	Yb	61332	64799.17	-5.35%
26	Fe	7112	8525.36	-16.58%	71	Lu	63314	66690.36	-5.06%
27	Co	7709	9219.30	-16.38%	72	Hf	65351	68608.77	-4.75%
28	Ni	8333	9940.44	-16.17%	73	Ta	67416	70554.39	-4.45%
29	Cu	8979	10688.79	-16.00%	74	W	69525	72527.21	-4.14%
30	Zn	9659	11464.35	-15.75%	75	Re	71676	74527.25	-3.83%
31	Ga	10367	12267.11	-15.49%	76	Os	73871	76554.50	-3.51%
32	Ge	11103	13097.09	-15.23%	77	Ir	76111	78608.97	-3.18%
33	As	11867	13954.28	-14.96%	78	Pt	78395	80690.64	-2.84%
34	Se	12658	14838.67	-14.70%	79	Au	80725	82799.52	-2.51%
35	Br	13474	15750.28	-14.45%	80	Hg	83102	84935.62	-2.16%
36	Kr	14326	16689.10	-14.16%	81	Tl	85530	87098.92	-1.80%
37	Rb	15200	17655.12	-13.91%	82	Pb	88005	89289.44	-1.44%
38	Sr	16105	18648.36	-13.64%	83	Bi	90526	91507.17	-1.07%
39	Y	17038	19668.80	-13.38%	84	Po	93105	93752.11	-0.69%
40	Zr	17998	20716.46	-13.12%	85	At	95730	96024.26	-0.31%
41	Nb	18986	21791.33	-12.87%	86	Rn	98404	98323.62	0.08%
42	Mo	20000	22893.41	-12.64%	87	Fr	101137	100650.20	0.48%
43	Tc	21044	24022.69	-12.40%	88	Ra	103922	103003.98	0.89%
44	Ru	22117	25179.19	-12.16%	89	Ac	106755	105384.98	1.30%
45	Rh	23220	26362.90	-11.92%	90	Th	109651	107793.19	1.72%
46	Pd	24350	27573.82	-11.69%	91	Pa	112601	110228.60	2.15%
47	Ag	25514	28811.95	-11.45%	92	U	115606	112691.23	2.59%

Figure 2
Binding Energy Deviation from 100% Accuracy per Atomic Element
without Correction (equation 6.8)

8. Sample Detailed Calculations

We can apply equation 7.1 to any element from lithium to uranium.

a. Oxygen

Calculating the 1s orbital for oxygen we get 534.534eV (all values are off from table due to rounding):

$$O_{1s} = \frac{r_e \dfrac{\sqrt{8^2+1}-1}{2}}{\alpha_0 \dfrac{\sqrt{8^2+1}+1}{2}} A_u \frac{8 \cdot e_{emax} \cdot 8 \cdot e_{emax} \cdot \sqrt[8^2]{2} \cdot (.757+.0028 \cdot 8)}{2\lambda_C}$$

$$O_{1s} = \frac{2.818 \times 10^{-15} m \cdot 3.531}{5.292 \times 10^{-11} m \cdot 4.531} 1.419 \times 10^{12} \frac{kg \cdot m^3}{sec^2 \cdot coul^2} \frac{64 \cdot 1.400 \times 10^{-37} coul^2 \cdot 1.011 \cdot .779}{2 \cdot 2.426 \times 10^{-12} m}$$

$$O_{1s} = 4.150 \times 10^{-5} \cdot 1.419 \times 10^{12} \frac{kg \cdot m^3}{sec^2 \cdot coul^2} \frac{7.055 \times 10^{-36} coul^2}{4.852 \times 10^{-12} m}$$

$$O_{1s} = 8.564 \times 10^{-17} joule = 534.534eV$$

b. Iron

The ground state electron for iron is similarly calculated:

$$Fe_{1s} = \frac{r_e \dfrac{\sqrt{26^2+1}-1}{2}}{\alpha_0 \dfrac{\sqrt{26^2+1}+1}{2}} A_u \frac{26 \cdot e_{emax} \cdot 26 \cdot e_{emax} \cdot \sqrt[26^2]{2} \cdot (.757+.0028 \cdot 26)}{2\lambda_C}$$

$$Fe_{1s} = \frac{2.818 \times 10^{-15} m \cdot 12.510}{5.292 \times 10^{-11} m \cdot 13.510} 1.419 \times 10^{12} \frac{kg \cdot m^3}{sec^2 \cdot coul^2} \frac{676 \cdot 1.400 \times 10^{-37} coul^2 \cdot 1.001 \cdot .830}{2 \cdot 2.426 \times 10^{-12} m}$$

$$Fe_{1s} = 4.931 \times 10^{-5} \cdot 1.419 \times 10^{12} \frac{kg \cdot m^3}{sec^2 \cdot coul^2} \frac{7.861 \times 10^{-35} coul^2}{4.852 \times 10^{-12} m}$$

$$Fe_{1s} = 1.134 \times 10^{-15}\, joule = 7.077 \times 10^{3}\, eV$$

c. Uranium

The calculation for uranium is:

$$U_{1s} = \frac{r_e \dfrac{\sqrt{92^2+1}-1}{2}}{\alpha_0 \dfrac{\sqrt{92^2+1}+1}{2}} A_u \frac{92 \cdot e_{emax} \cdot 92 \cdot e_{emax} \cdot {}^{92^2}\!\sqrt{2} \cdot (.757 + .0028 \cdot 92)}{2\lambda_C}$$

$$U_{1s} = \frac{2.818 \times 10^{-15}\, m \cdot 45.503}{5.292 \times 10^{-11}\, m \cdot 46.503} 1.419 \times 10^{12}\, \frac{kg \cdot m^3}{sec^2 \cdot coul^2} \frac{8.464 \times 10^{3} \cdot 1.400 \times 10^{-37}\, coul^2 \cdot 1.000 \cdot 1.015}{2 \cdot 2.426 \times 10^{-12}\, m}$$

$$U_{1s} = 5.211 \times 10^{-5} \cdot 1.419 \times 10^{12}\, \frac{kg \cdot m^3}{sec^2 \cdot coul^2} \frac{1.202 \times 10^{-33}\, coul^2}{4.852 \times 10^{-12}\, m}$$

$$U_{1s} = 1.832 \times 10^{-14}\, joule = 1.144 \times 10^{5}\, eV$$

9. Conclusion

The Aether Physics Model electron binding energy equations for the 1s orbitals are not exact, but very close, especially considering that all the elemental ground states are calculated from first principles. There is the possibility the data could be faulty, however it is more likely there are aspects of the Aether structure which the equation is not yet addressing. These aspects may surface as future modifications to the equation calculate the remaining electron orbital positions.

The electron binding energy equation is the first quantum mechanical expression of the Aether Physics Model and demonstrates the model is viable. Unlike the quantum mechanics of the mass/energy paradigm, the Aether Physics Model is discrete and devoid of probability functions and paradoxes, which should make it superior to the Standard Model when fully developed.

Now that the Aether Physics Model quantifies the quantum structure and we have produced our first set of equations, the analysis must develop further until it explains all aspects of the atom. We should then be able to quantify the structural aspects of associated molecules. We also need to quantify and explore the mechanics of light very thoroughly.

Acknowledgement

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