On the Limit for the Periodic Table of the elements

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Abstract

It has been proved that the $5g = 18$ is unstable, the heaviest element that occurs naturally is uranium with an atomic number of 92 and the island of stability does not exist using the modified Pauli principle. This is the Book proof.

Theorists who have studied the structure of atomic nuclei have suggested that heavy elements with an atomic number around 114 could be quite long lived. They might exist in a so-called island of stability. Enormous funds and efforts have been spent on experimental attempts to synthesize superheavy elements in nuclear laboratories. Efforts of this type have been unsuccessful so far. They have produced elements 110, 111 and 112. The elements are extremely unstable, with half-lives of only microseconds [1-4].

In studying the stability of the many-body problem we suggest two principles [5-11].

(1) The prime number principle. A prime number is irreducible in the integers, it seems therefore natural to associate it with the most stable subsystem. We show that 1, 3, 5, 7, 11, 23, 47 are the most stable primes.

(2) The symmetric principle. The most stable configuration of two prime numbers is then stable symmetric system in nature. We show that 2, 6, 10, 14, 22, 46, 94 are the most stable even numbers. The stability can be defined as long life and existence in nature, and instability as short life or non-existence.

Conjecture: The total number of electrons in all shells must equal the number of protons in the nucleus. Protons arrange themselves in shell in a nucleus because they take up configurations which are analogous to those of electrons in atoms, with preferred stable shells of protons. By using the prime number principle and the symmetric Principle we study the proton configuration [9-11].

In this paper by using the prime number principle and the symmetric principle we study the elecron configuration of the elements. Total quantum number n and orbital quantum number l determine the election structures of many-electron atoms:

Electron shells:	$n=$	1	2	3	4	5	6…
		K	L	M	N	O	P…
Electron subshells:	$2(2l+1)=$	2	6	10	14	18	22…
		s	p	d	f	g	h…

An atomic subshell that contains its full quota of electrons is said to be closed. A closed s subsell $(l=0)$ holds two electrons, a closed p subshell $(l=1)$ six electrons, a closed d subshell $(l=2)$ ten electrons, a closed f subshelll $(l=3)$ fouteen electrons, a closed g subshelll $(l=4)$ eighteen electrons, a closed h subshelll $(l=5)$ twenty-two electrons, and so on. The Pauli principle permits

$2(2l+1)$ particles per subshell. It has been proved that $2(2l+1)=2, 6, 10, 14, 22$ and 46 are stable and $2(2l+1)=18$ is unstable [7]. The s, p, d, and f subshells are stable and the g subshell is unstable, which are called the modified Pauli principle.

Table 1 shows the electron configurations of the elements. From 1 to 92 of the atomic numbers every subshell is stable. It has been proved that the heaviest element that occurs naturally is uranium with an atomic number of 92. Beginning at the atomic number of 93 there is an unstable subshell $(5g)$ in it. These elements get more and more unstable. Element 114 is the extremely unstable. The island of stability around atomic number 114 does not exist. Since $5g$ is unstable, in $6s$, $6p$, $6d$, $6f$ and $6g$ subshells there are no electrons. The Chinese idiom: If the lips are gone, the teeth will be cold. Therefore the elements 114-118 do not exist in nature [12]. This is the Book proof.

Remark. Pythagorean claims that everything is number. We claim that everything is stable number, that is, it obeys the prime number principle and the symmetric principle. Above two principles are foundations of structural genomics in the human genome project. Homo-sapiens is so advanced because we have 46 chromosomes (23 pairs) in a cell. There are the most stable sequences: 3-bp, 5-bp and 7-bp in tRNA. The three nucleotides are able to form only stable sequences: $4^3=64$. The five nucleotides are able to form the most stable sequences: $4^5=1024$. The above studies can be further extended to whole biological field. From above two theorems we suggest new evolution theory in the biology. The evolution of the living organism starts with mutant of he prime number. The living organisms mutants from a prime number system to another new one which may be produced a new species to raise up seed and its structure tended to stabilize in given environment. From the above two principles we find the analogies between the Chinese poem and the English poem, such as the iambic pentameter in English poem and five or seven characters in Chinese poem. Although the languages are different, the human brains are the same. The brain structures and the structures of the nervous system can be studied. For example, there are Tyr-Gly-Gly-Phe-Met, Met-enkephalin and Tyr-Gly-Phe-Leu, Leu-enkephalin in brain [7].

Table 1. Electron Configuration of the Elements

		K	*L*		*M*			*N*				*O*				
		1s	*2s*	*2p*	*3s*	*3p*	*3d*	*4s*	*4p*	*4d*	*4f*	*5s*	*5p*	*5d*	*5f*	*5g*
1	H	1														
2	He	2														
3	Li	2	1													
4	Be	2	2													
5	B	2	2	1												
6	C	2	2	2												
7	N	2	2	3												
8	O	2	2	4												
9	F	2	2	5												
10	Ne	2	2	6												
11	Na	2	2	6	1											
12	Mg	2	2	6	2											
13	Al	2	2	6	2	1										
14	Si	2	2	6	2	2										
15	P	2	2	6	2	3										
16	S	2	2	6	2	4										
17	Cl	2	2	6	2	5										
18	Ar	2	2	6	2	6										
19	K	2	2	6	2	6	1									
20	Ca	2	2	6	2	6	2									
21	Sc	2	2	6	2	6	3									
22	Ti	2	2	6	2	6	4									
23	V	2	2	6	2	6	5									
24	Cr	2	2	6	2	6	6									
25	Mn	2	2	6	2	6	7									
26	Fe	2	2	6	2	6	8									
27	Co	2	2	6	2	6	9									
28	Ni	2	2	6	2	6	10									
29	Cu	2	2	6	2	6	10	1								
30	Zn	2	2	6	2	6	10	2								
31	Ga	2	2	6	2	6	10	2	1							
32	Ge	2	2	6	2	6	10	2	2							
33	As	2	2	6	2	6	10	2	3							
34	Se	2	2	6	2	6	10	2	4							
35	Br	2	2	6	2	6	10	2	5							
36	Kr	2	2	6	2	6	10	2	6							
37	Rb	2	2	6	2	6	10	2	6	1						
38	Sr	2	2	6	2	6	10	2	6	2						
39	Y	2	2	6	2	6	10	2	6	3						
40	Zr	2	2	6	2	6	10	2	6	4						
41	Nb	2	2	6	2	6	10	2	6	5						
42	Mo	2	2	6	2	6	10	2	6	6						
43	Tc	2	2	6	2	6	10	2	6	7						
44	Ru	2	2	6	2	6	10	2	6	8						
45	Rh	2	2	6	2	6	10	2	6	9						
46	Pd	2	2	6	2	6	10	2	6	10						

Table 1 (Continued)

		K	L		M			N				O				
		1s	*2s*	*2p*	*3s*	*3p*	*3d*	*4s*	*4p*	*4d*	*4f*	*5s*	*5p*	*5d*	*5f*	*5g*
47	Ag	2	2	6	2	6	10	2	6	10	1					
48	Cd	2	2	6	2	6	10	2	6	10	2					
49	In	2	2	6	2	6	10	2	6	10	3					
50	Sn	2	2	6	2	6	10	2	6	10	4					
51	Sb	2	2	6	2	6	10	2	6	10	5					
52	Te	2	2	6	2	6	10	2	6	10	6					
53	I	2	2	6	2	6	10	2	6	10	7					
54	Xe	2	2	6	2	6	10	2	6	10	8					
55	Cs	2	2	6	2	6	10	2	6	10	9					
56	Ba	2	2	6	2	6	10	2	6	10	10					
57	La	2	2	6	2	6	10	2	6	10	11					
58	Ce	2	2	6	2	6	10	2	6	10	12					
59	Pr	2	2	6	2	6	10	2	6	10	13					
60	Nd	2	2	6	2	6	10	2	6	10	14					
61	Pm	2	2	6	2	6	10	2	6	10	14	1				
62	Sm	2	2	6	2	6	10	2	6	10	14	2				
63	Eu	2	2	6	2	6	10	2	6	10	14	2	1			
64	Gd	2	2	6	2	6	10	2	6	10	14	2	2			
65	Tb	2	2	6	2	6	10	2	6	10	14	2	3			
66	Dy	2	2	6	2	6	10	2	6	10	14	2	4			
67	Ho	2	2	6	2	6	10	2	6	10	14	2	5			
68	Er	2	2	6	2	6	10	2	6	10	14	2	6			
69	Tm	2	2	6	2	6	10	2	6	10	14	2	6	1		
70	Yb	2	2	6	2	6	10	2	6	10	14	2	6	2		
71	Lu	2	2	6	2	6	10	2	6	10	14	2	6	3		
72	Hf	2	2	6	2	6	10	2	6	10	14	2	6	4		
73	Ta	2	2	6	2	6	10	2	6	10	14	2	6	5		
74	W	2	2	6	2	6	10	2	6	10	14	2	6	6		
75	Re	2	2	6	2	6	10	2	6	10	14	2	6	7		
76	Os	2	2	6	2	6	10	2	6	10	14	2	6	8		
77	Ir	2	2	6	2	6	10	2	6	10	14	2	6	9		
78	Pt	2	2	6	2	6	10	2	6	10	14	2	6	10		
79	Au	2	2	6	2	6	10	2	6	10	14	2	6	10	1	
80	Hg	2	2	6	2	6	10	2	6	10	14	2	6	10	2	
81	Tl	2	2	6	2	6	10	2	6	10	14	2	6	10	3	
82	Pb	2	2	6	2	6	10	2	6	10	14	2	6	10	4	
83	Bi	2	2	6	2	6	10	2	6	10	14	2	6	10	5	
84	Po	2	2	6	2	6	10	2	6	10	14	2	6	10	6	
85	At	2	2	6	2	6	10	2	6	10	14	2	6	10	7	
86	Rn	2	2	6	2	6	10	2	6	10	14	2	6	10	8	
87	Fr	2	2	6	2	6	10	2	6	10	14	2	6	10	9	
88	Ra	2	2	6	2	6	10	2	6	10	14	2	6	10	10	
89	Ac	2	2	6	2	6	10	2	6	10	14	2	6	10	11	
90	Th	2	2	6	2	6	10	2	6	10	14	2	6	10	12	
91	Pa	2	2	6	2	6	10	2	6	10	14	2	6	10	13	
92	U	2	2	6	2	6	10	2	6	10	14	2	6	10	14	

Table 1 (Continued)

		K	L		M			N				O				
		1s	*2s*	*2p*	*3s*	*3p*	*3d*	*4s*	*4p*	*4d*	*4f*	*5s*	*5p*	*5d*	*5f*	*5g*
93	Np	2	2	6	2	6	10	2	6	10	14	2	6	10	14	1
94	Pu	2	2	6	2	6	10	2	6	10	14	2	6	10	14	2
95	Am	2	2	6	2	6	10	2	6	10	14	2	6	10	14	3
96	Cm	2	2	6	2	6	10	2	6	10	14	2	6	10	14	4
97	Bk	2	2	6	2	6	10	2	6	10	14	2	6	10	14	5
98	Cf	2	2	6	2	6	10	2	6	10	14	2	6	10	14	6
99	Es	2	2	6	2	6	10	2	6	10	14	2	6	10	14	7
100	Fm	2	2	6	2	6	10	2	6	10	14	2	6	10	14	8
101	Md	2	2	6	2	6	10	2	6	10	14	2	6	10	14	9
102	No	2	2	6	2	6	10	2	6	10	14	2	6	10	14	10
103	Lr	2	2	6	2	6	10	2	6	10	14	2	6	10	14	11
104	Rf	2	2	6	2	6	10	2	6	10	14	2	6	10	14	12
105	Db	2	2	6	2	6	10	2	6	10	14	2	6	10	14	13
106	Sg	2	2	6	2	6	10	2	6	10	14	2	6	10	14	14
107	Bh	2	2	6	2	6	10	2	6	10	14	2	6	10	14	15
108	Hs	2	2	6	2	6	10	2	6	10	14	2	6	10	14	16
109	Mt	2	2	6	2	6	10	2	6	10	14	2	6	10	14	17
110	Ds	2	2	6	2	6	10	2	6	10	14	2	6	10	14	18

Note. $5g$ is an unstable subshell.

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