On the Limit for the Periodic Table of the Elements

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It has been proved that 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.

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 [1-3].

In studying the stability of the many-body problem we suggest two principles [4-7].

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

(2) The symmetric principle. The moot 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.

In a nucleus there are three configurations: the outermost electron configuration, the middlemost neutron and two innermost protons. By using the prime number principle and the symmetric Principle we study the innermost proton configuration.

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.

Total quantum number h and orbital quantum number ℓ determine the proton structures of many-proton atoms:

Proton shells:	$h =$	1	2	3	4	5	6...
		K	L	M	N	O	P...
Proton subshells:	$2(2\ell+1) =$	2	6	10	14	18	22...
		s	p	d	f	g	h...

An atomic subshell that contains its full quota of protons is said to be closed. A closed s subshell(ℓ = O) holds two protons, a closed p subshell (ℓ = 1) six protons, a closed d subshell(ℓ = 2) ten protons, a closed f subshell(ℓ = 3) fouteen protons, a closed g subshell (ℓ = 4) eighteen protons, a closed h subshell(ℓ = 5) twenty-two protons, and so on. The Pauli principle permits $2(2\ell + 1)$ particles per subshell. It has been proved that $2(2\ell + 1) = 2, 6, 10, 14, 22$ and 46 are stable and $2(2\ell + 1) = 18$ is unstable[6]. 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 proton 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 least stable. The island of stability around atomic number 114 does not exist.

In the middlemost neutron configuration there is no shell one. Magic numbers and isotopes are closely related to the neutron numbers.

The electron configuration and proton one have the same subshell one. Since 5g is unstable, in 6s, 6p, 6d, 6f, and 7s subshells there are no electrons.

References

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Table 1. Proton Configurations of the Elements

		K	L		M			N				O					P	
		1s	2s	2p	3s	3p	3d	4s	4p	4d	4f	5s	5p	5d	5f	5g	6s	6p
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	0	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	5	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	Ca	2	2	6	2	6	10	2	1									
32	Ce	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								
47	Ag	2	2	6	2	6	10	2	6	10								
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	ta	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							

Table 1 (Continued)

		K	L		M			N				O					P	
		1s	**2s**	**2p**	**3s**	**3p**	**3d**	**4s**	**4p**	**4d**	**4f**	**5S**	**5p**	**5d**	**5f**	**5g**	**6s**	**6p**
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	Cd	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	By	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			
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	Nd	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	af	2	2	6	2	6	10	2	6	10	14	2	6	10	14	12		
105	Ha	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	tts	2	2	6	2	6	10	2	6	10	14	2	6	10	14	15		
108	Ho	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		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18		
111		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	1	
112		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	2	
113		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	2	1
114		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	2	2
115		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	2	3
116		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	2	4
117		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	2	5
118		2	2	6	2	6	10	2	6	10	14	2	6	10	14	18	2	6

Note. 5g is an unstable subshell.