WHY NOBLE GASES (EXCEPT HE) HAVE 8 ELECTRONS IN THEIR OUTER SHELLS ?

DAVID GROSS
www.mcinvent.com
MATHCOM *INVENTIONS* LTD.

Keywords :*Realex Space, Octet rule*

Abstract

This paper presents an explanation to the construction of the periodic table of the elements. The octave symmetry of the noble gases, and the octet rule for covalent bonding, showing that the number 8 is unique – but why eight?

Realex Space Graphing (RSG), a method to visualize functions at the Realex Space, brings the solution to the dilemma, by looking into a point charge and its symmetry.

Contact author: **David Gross**
E-mail: dgross9@attglobal.net

1. RSG Method

1.1 The Realex-Plane

Definition 1.1.1:
Let A be a point in the Realex-Plane. It consist of three arguments: x and y will represent the position of the point, and ϕ as the real potential of the point, and presents by color:

$$A\#\,(x,y,\phi) \qquad (1)$$

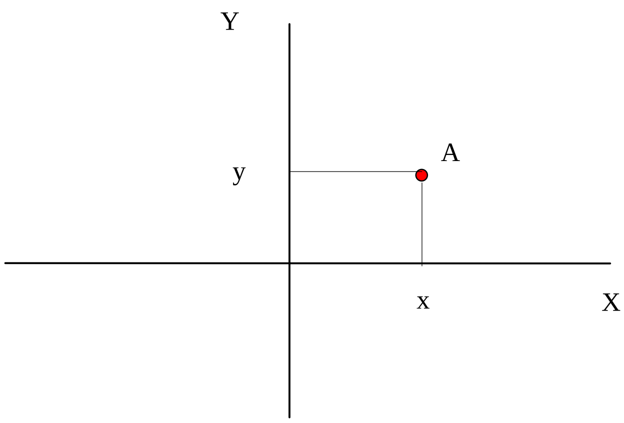

Fig. 1 A point in the Realex-plane

Definition 1.1.2:

The real-potential is a function of the coordinates of a point A and of a physical parameters, such as time, mass or charge:

$$\phi = f\,(x, y, z, q, m, t) \qquad (2)$$

For example, let :

$$\phi = x + y \quad (3)$$

and let x=1, y=2 and ϕ=3 :

$$A\# (x,y,\phi) = A\# (1,2,3) \quad (4)$$

and let x=2, y=1 and ϕ=3 ,for point B:

$$B\# (x,y,\phi) = B\# (2,1,3) \quad (5)$$

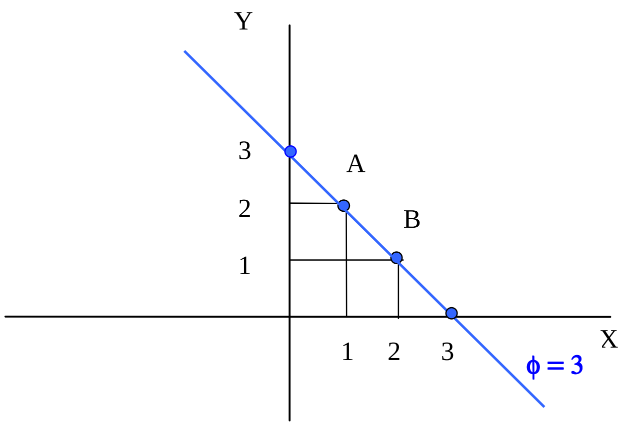

Fig. 2 Points with equal potential

The points which have the same potential forming a curve or a line which depend of the function itself. In this case , a straight line.

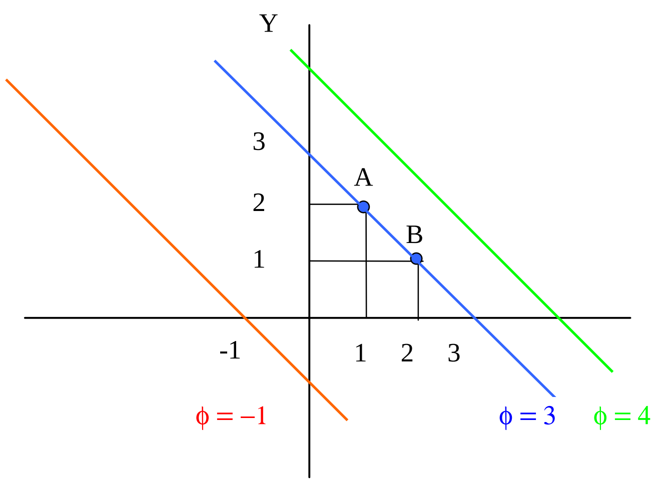

Fig. 3 Equipotential lines

2. Results

2.1 Electron configuration

Let:

$$\phi = x^2+y^2 \quad (6)$$

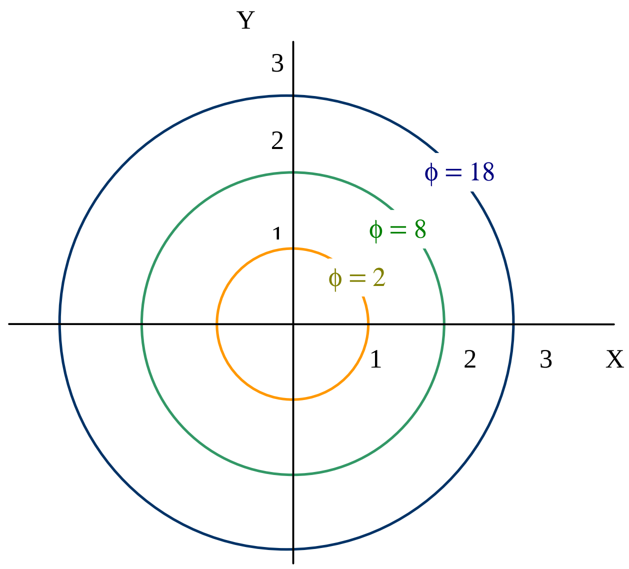

Fig. 4 Electron shells

The first circle:

$$\phi = x^2+y^2 = 1^2+1^2= 2 \quad (7)$$

The second circle:

$$\phi = x^2+y^2 = 2^2+2^2= 8 \quad (8)$$

The third circle:

$$\phi = x^2+y^2 = 3^2+3^2= 18 \quad (9)$$

And in general, as x = y = n :

$$\phi = x^2+y^2 = n^2 + n^2 = 2n^2 \quad (10)$$

If we let n to be the principal quantum numbers, we reach by this way the maximum number of electrons allowed in the electron shells: **2, 8 ,18, 32, 50, 72...**

2.2 A point charge

Equation no. 11, shows the electric potential of a point charge:

$$\phi \ = \ q \,/\, sqrt(x \,\verb|^|2+y \,\verb|^|2) \qquad (11)$$

RSG software that developed by the author, used to look at equation no. 11 . The result appears at Fig. no. 5:

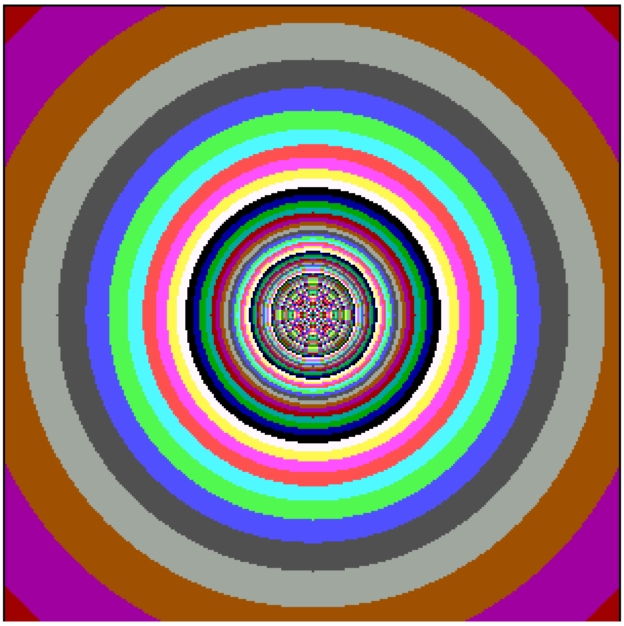

Fig. 5 A point charge

Studying from Fig. no. 5 that the distribution of the potential is not uniform. Especially at a close distance to the point charge which located at the middle of the drawing,

A **double four-fold symmetry** can be pointed: at 0,90,180 and 270 deg. the first one, and 45,135,225 and 315 deg. , the second one .

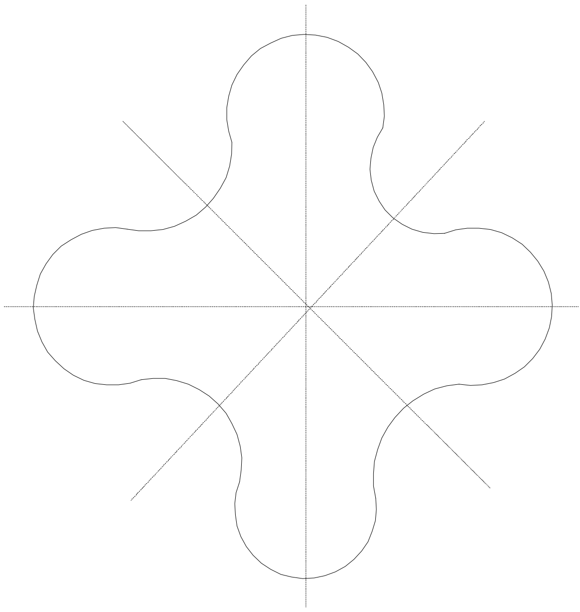

Fig. 6 Wave-Particle electron structure

4. Conclusions

Presenting the equations by the RSG method ,shows that the number 8, has stability in a circular manner and symmetry in an electric manner. Both of them required for a stable and symmetric shell.

The question should be asked at larger scale: is the DNA structure, which consist of a **double helix of four bases**, is similar as the electron ?

I think that the answer to this question is - yes. As the symmetry of a brick can teach of the symmetry of the building, so, the electron structure can describe symmetries at higher scales.

.

References

[1] . David Gross, *Method and system for display of an additional dimension.* Israel patent no. 121431 ,
U.S Patent Application Serial No.: 09/120,764,
[2] . David Gross, *The Realex-Space, a new method to describe the universe.* 8th International Symposium on Flow Visualization, September 1998, Sorrento Italy

