Paradigm Academic Press
Innovation in Science and Technology
ISSN 2788-7030
NOV. 2022 VOL.1 NO.4

Electron Orbiting Patterns

Dana George Cottrell[1]

[1] Retired Electrical Engineer

Correspondence: Dana George Cottrell, 7269 W. Brubeck Ct., Tucson, Arizona 85743.

doi:10.56397/IST.2022.11.03

Abstract

This article presents electron orbiting patterns based on a symmetrical orthogonal arrangement of protons and neutrons in the nucleus of an atom as outlined in a published article titled *An Orthogonal Mechanical Model of Stable Nuclei* (Dana George Cottrell, 2021). In that article, an electron orbiting arrangement about the orthogonal axes was developed which adapted the mechanical models to the Periodic Table. This article will show how electron orbiting patterns on two axes group elements in accordance to the Periodic Table. In the interest of simplicity, binding energies and energy levels using quantum and wave mechanics are not described in this article.

Keywords: electron orbiting patterns, electron spin, electron orbits/nuclear structures, nuclear structures/electron orbits

1. Introduction

Figure 1 is an example of an orthogonal structure of neon in which the nucleons are symmetrically arranged on an x, y and z axis. To further validate this and other orthogonal patterns, one could assume an electron orbiting arrangement on the orthogonal axes to see how well the pattern adapts chemical elements to the Periodic Table.

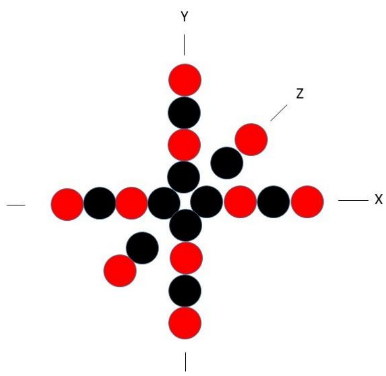

Figure 1. Neon $_{10}Ne^{20}$ structure

Given the orthogonal arrangements, electrons orbit perpendicular to the x and y axes, whereby the electrons on one side orbit in the opposite direction of those on the other side for each axis. Each electron is connected to a nucleon on its respective axis by an energy string (perhaps made up of photons). Figure 2 shows two quadrupoles rotating in opposite directions on a single axis. For neon, there are two non-rotating monopoles, one on each end of the axis.

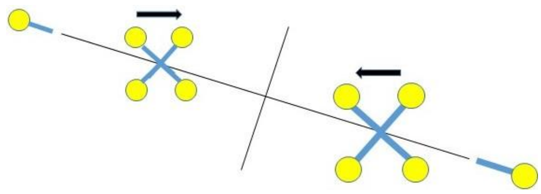

Figure 2. The two quadrupoles of neon rotating in opposite directions on a single axis

Figure 3 is a top view of four quadrupoles rotating and meshing together on two axes. For this to work, electrons can't be orbiting on the z-axis. The number of electrons is limited to four on any given plane.

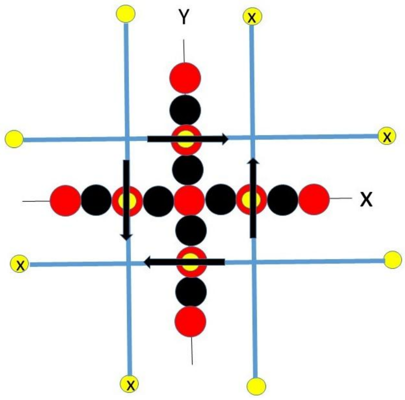

Figure 3. A top view of four quadrupoles rotating and meshing together on two axes

2. Model Development

The horizontal rows of the Periodic Table are called periods. Each vertical column in the Table makes up a related group of elements based on their chemical behavior. Figure 4 shows the electron orbit pattern for the Group 1 alkali metals: lithium, sodium and potassium.

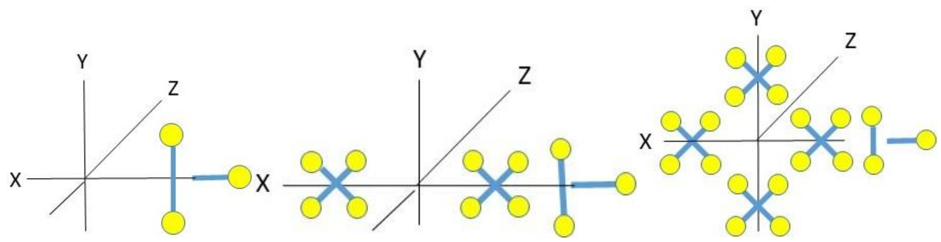

Figure 4a. Lithium Figure 4b. Sodium Figure 4c. Potassium

For lithium, there is one electron (monopole) next to two electrons opposite each other (dipole) orbiting in the same direction on the x-axis. For sodium, there are two quadrupoles orbiting on each end of the x-axis and the same pattern as lithium on the x-axis. For potassium, there are four quadrupoles evenly spread out on the x and y axes with the lithium pattern on the x-axis. As will be shown, this monopole and dipole pattern can be seen in the whole group with the exception of hydrogen which has only one electron.

To establish a reasonable scheme to demonstrate how orbiting patterns progress through the Periods and down through the Groups of the Periodic Table (1 December 2018), (See Figure 5), it's best to think in terms of balance, stability and symmetry. As the schemes were completed, a boot strap method was used to go back over the Groups and Periods and adjust the orbiting patterns to a best fit. This leads to an excellent understanding of how grouped elements relate to each other and how molecules are formed through covalent bonding.

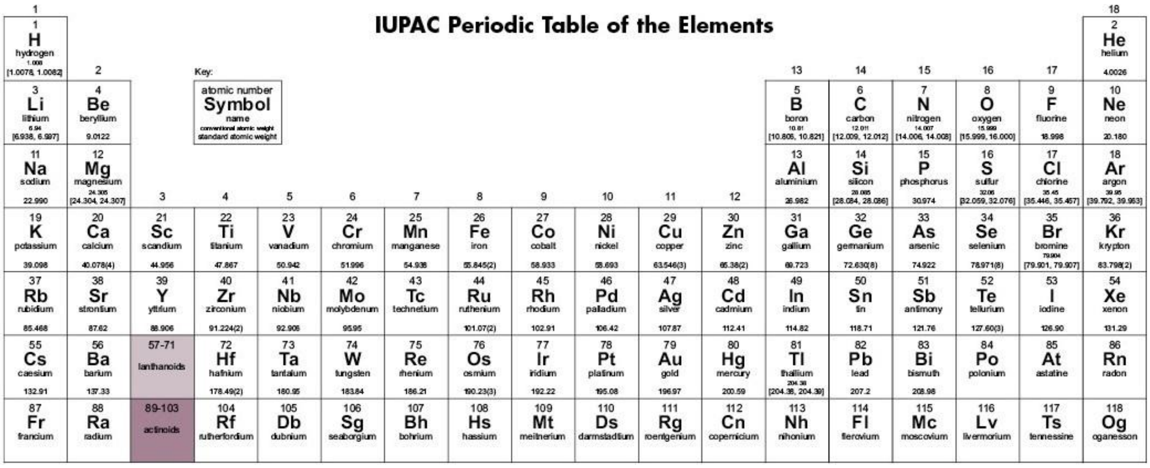

Figure 5. IUPAC Periodic Table of the Elements (minus elements 59-71 and 90-103)

To facilitate generating electron configurations and saving space, the following nomenclature is used.

Figure 6. Nomenclature used in Electron configurations

For example, Figure 4 would look like that in Figure 7.

Figure 7. Lithium ($_3$Li), Sodium ($_{11}$Na), and Potassium ($_{19}$K) configurations

The remaining Group 1 elements have the configurations shown in Figure 8.

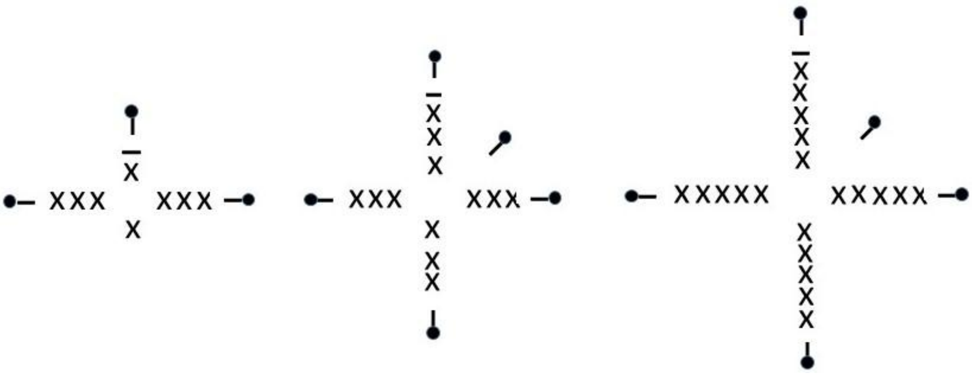

Figure 8. Rubidium ($_{37}$Rb), Cesium ($_{55}$Cs), and Francium ($_{87}$Fr) configurations

Notice the symmetrical arrangement of the quadrupoles in each element of Group 1 along with the lithium configuration (dipole and monopole). A monopole is placed on the z-axis for Cesium and Francium. It was found that in the higher elements, monopoles exist on the z-axis. The dipole and monopole configuration gives the Group 1 elements a common chemical characteristic.

When going through various schemes and generating electron configurations, it was found that when a quadrupole and a dipole or a quadrupole and a quadrupole are next to each other, a monopole is required on that side of the axis.

The uniqueness of Groups 2 and Groups 13 through 18 is shown in Figure 9 for Periods 2 and 3. Group 1 is shown in Figure 7.

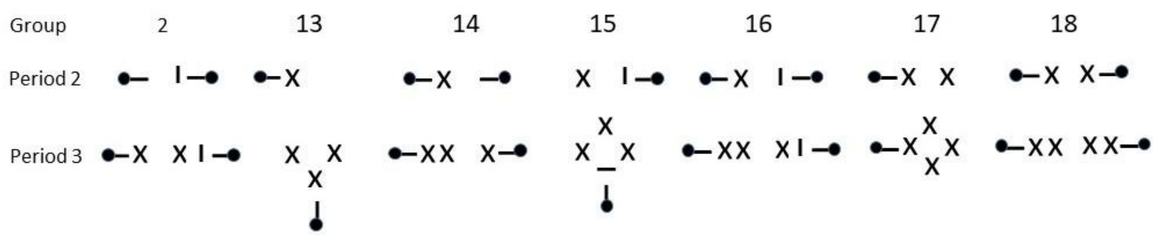

Figure 9. Uniqueness of Groups 2 and 13 through 18 for Periods 2 and 3

Figure 10 shows the electron configurations for Group 14 (Geranium through Lead). The configurations for Carbon and Silicon (Group 14) are shown in Figure 9 above.

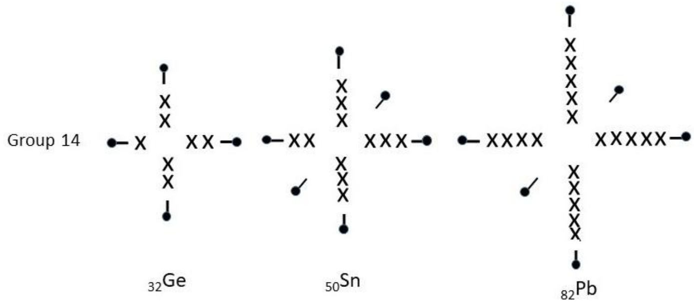

Figure 10. Group 14 configurations for Geranium through Lead

Notice the extra quadrupole on the x-axis in each configuration and the associated monopoles on the z-axis for tin and lead. This defines the common characteristic for Group 14 elements. This procedure can be successfully performed for each group. One last group to be analyzed is the inert or Nobel gases (Group 18) as shown in Figure 11.

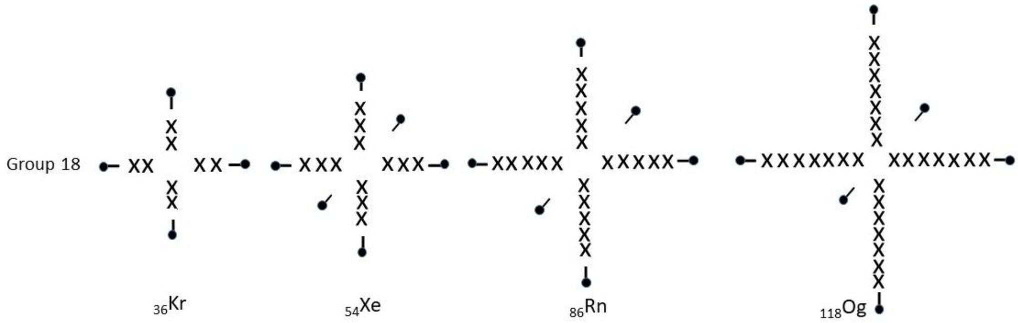

Figure 11. Group 18 configurations for Krypton through Oganesson

The configurations for $_{10}Ne$ and $_{18}Ar$ are shown in Figure 9. The symmetrical relationships of the quadrupoles along with the monopoles create stability. Using the right-hand rule where rotating electrons generate a magnetic field and along with the symmetrical arrangements, the interaction of the four fields would in essence cancel each other and could explain why the gases are inert. This hints at the possibility that magnetic fields play a role in combining elements into molecules.

Not to go too far into chemical reactions, one could conjecture that the water molecule H_2O (or H-O-H) could be as shown in Figure 12. The configuration for oxygen is shown in Figure 9 (Period 2, Group 16). When forming a water molecule, the oxygen configuration changes to two quadrupoles while sharing the monopoles from two hydrogen atoms. This is similar to the electron configuration of neon (see Figure 9, Period 2, Group 18). This suggests that the water molecule has a similar stable inertness as the inert element neon. As such, the water molecule could be identified by the orbiting frequencies of the quadrupoles and the vibrational frequencies of the monopoles.

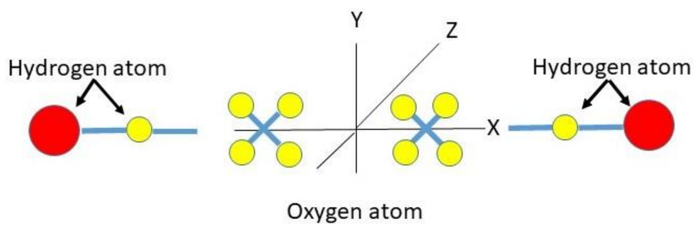

Figure 12. Water molecule

3. Summary

This electron orbiting model is based on an orthogonal arrangement of protons and neutrons. These electron orbiting patterns group elements in accordance to the Periodic Table using the orthogonal arrangements. Given that one can group elements in accordance to the Periodic Table, lends credence to the theory that nucleons are arranged in an orthogonal manner in the nucleus. The nucleon arrangements along with the electron orbiting patterns go hand-in-hand and opens the door for pushing the understanding of nuclear physics beyond the standard mode (BSM).

References

Dana George Cottrell. (2021). An Orthoganal Mechanical Model of Stable Nuclei. *International Journal of Physics, 9*(1).

IUPAC Periodic Table of the Elements. (1 December 2018). International Union of Pure and Applied Physics.

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (http://creativecommons.org/licenses/by/4.0/).