Contact: info@calqlata.com

Newton's Atom (Rev. 1.0)

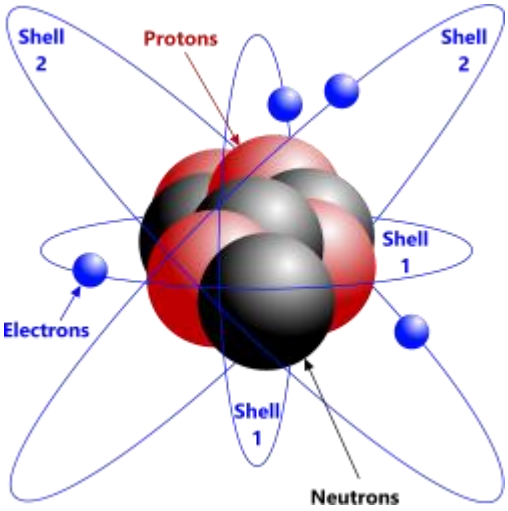
By Keith Dixon-Roche © 28/10/2017

0. Introduction

Establish a means whereby sub-atomic particles may be described and defined using Newtonian mechanics, thereby unifying atomic and sub-atomic theories:

*(Refer to **Appendix 1** for an explanation of the mathematical formulas, constants, symbols and units used in this document)*

1. Conclusions



It would appear that a combination of Planck's, Coulomb's and Newton's laws provide all the information required to describe the properties and behaviour of the neutron, proton and electron within an atom as well as planetary systems via the universal force coupling factor 'φ'

Moreover, the atom is not nearly as complicated as has been claimed. It comprises only three sub-atomic particles; electrons following evenly spaced circular orbits around a nucleus of protons and neutrons

A very simple system!

There is no such thing as mass as we know it. Mass is a partial energy state that varies with kinetic energy.

Every part of every atom (from Z = 1 to Z = 92) has been fully analysed and explained using Newton's and Coulomb's laws during the generation of this paper.

2. Newtonian & Planck Systems

A Ryberg atom of protons and orbiting electrons
and
A Planck mass orbiting a Planck force-centre
and
Two planetary force-centres each with a single orbiting planetary body

3. Methodology

Calculate and compare gravitational and centripetal forces in the following systems

Determine the nature of the coupling force in the Planck system

If the Planck system is gravitational only, then Planck's atom may be used to apply Newton's laws to atomic particles

4. Calculations

4.1 Direct Application of Newton's Laws of Motion

In these calculations, the electron and proton in an hydrogen atom have been treated as a satellite orbiting a force-centre.

The purpose of these calculations is to see if Newton's laws of motion can be applied to atoms.

The following Table compares the results from calculations using Newton's laws of motion in combination with Coulomb's law between the earth and an hydrogen atom under gravitational or electrostatic attraction.

Symbols	Earth	Gravitational Force	Electrostatic Force	Units
G	6.67359232E-11	6.67359232E-11	8.98755185E+09	$m^3/kg/s^2$
m_1	1.9885E+30	1.67262164E-27	1.60217649E-19	kg
m_2	5.96451977E+24	9.1093897E-31	1.60217649E-19	kg
Orbit				
T	31558118	7239.40504	6.37390647E-11	s
a	1.495945981E+11	5.2917721E-11	5.2917721E-11	m
b	1.495737135E+11	5.2917721E-11	5.2917721E-11	m
$e^{(2)}$	0.01670914665	**0**	**0**	
p	1.49552832E+11	5.29177211E-11	5.29177211E-11	m
f	1.47095E+11	5.29177211E-11	5.29177211E-11	m
x'	2.49959808E+09	0	0	m
L	9.39864971E+11	3.32491847E-10	3.32491847E-10	m
K	2.97491436E-19	3.53673364E+38	2.74162451E+10	s^2/m^3
A	7.02944537E+22	8.79735542E-21	8.79735542E-21	m^2
Perigee				
Ř	1.47095E+11	5.291772107E-11	5.291772107E-11	m
Ť	3.658178805E+22	3.631151755E-47[1]	8.238722050E-08[1]	N
g	-6.133232761E-03	-3.986163590E-17	-5.142206314E+11	m/s^2
v̌	3.028600879E+04	4.592806255E-14	5.216453195	m/s
h	4.454920463E+15	2.430408403E-24	2.760428151E-10	m^2/s
PE	-5.380998113E+33	-1.921522757E-57	-4.359743954E-18	N.m
KE	2.735455000E+33	9.607707959E-58	2.179871977E-18	N.m
E	-2.645543113E+33	-9.607519611E-58	-2.179871977E-18	N.m
Apogee				
$Ř^{(2)}$	**1.520941962E+11**	**5.291772107E-11**	**5.291772107E-11**	m
$Ř^{(2)}$	**1.520941962E+11**	**5.308391724E-11**	**5.291772497E-11**	m
F̈	3.421649078E+22	3.631151755E-47	8.238722050E-08	N
g	-5.736671536E-03	-3.986163590E-17	-5.142206314E+11	m/s^2
v̂	2.929053557E+04	4.592806255E-14	5.216453195	m/s
h	4.454920463E+15	2.430408403E-24	2.760428151E-10	m^2/s
PE	-5.204129660E+33	-1.921522757E-57	-4.359743954E-18	N.m
KE	2.558586547E+33	9.607707959E-58	2.179871977E-18	N.m
E	-2.645543113E+33	-9.607519611E-58	-2.179871977E-18	N.m

Table 0: Newton's of Motion Calculation Results

The above results reveal the following:

1) Ť (Newton) = Ť (Coulomb) x φ

2) Ř = Ř for all three subjects (i.e. the earth and the hydrogen atom under either force), which means that all three orbits comply with Newton's and Coulomb's laws.

That the above calculation technique is exactly the same in all three scenarios proves that Newton's laws of motion do indeed apply to atoms as long as Coulomb's electrostatic charge is included.

You may have noticed that the ratio between the gravitational and electrostatic coupling forces (Ť) for the in the above atom is 4.4074E-40, which is exactly equal to the force ratio constant; φ

4.2 Comparison Between Planetary and Atomic Orbits

In addition to the above proof of Newton's laws when applied to the atom, comparison calculations were carried out between planetary and electron orbits, all of which use identical theories and therefore strengthen the claim that Newton's laws apply to atomic structures.

The following Table of results show that the same calculation rules apply to Planck's Atom and planetary systems which are both coupled together with gravitational force only ($\varphi = 1$)

			Moon-Earth [1]		**Sun-Earth [1]**	
	Planck Atom	**Rydberg Atom**	**Perigee**	**Apogee**	**Perigee**	**Apogee**
v (m/s)	299792459	2187690.351	1084.034166	958.7083173	30279.07556	29287.2
R (m)	1.61617E-35	5.29177E-11	3.59508E+08	4.06504E+08	1.47095E+11	1.52060E+11
m_1 (kg)	2.17655E-08	1.67262E-27	5.96659E+24	5.96659E+24	1.98850E+30	1.98850E+30
m_2 (kg)	2.17655E-08	9.10939E-31	7.34892E+22	7.34892E+22	5.96659E+24	5.96659E+24
φ	1	4.40742E-40	1	1	1	1
F_g (N)	1.21038E+44	3.63115E-47	2.26408E+20	1.77084E+20	3.65945E+22	3.42437E+22
F_c (N)	1.21038E+44	3.63115E-47	2.40215E+20	1.66162E+20	3.71889E+22	3.36563E+22
F_g:F_c	1	1	1.00412615		1.000734727	

Table 1:
[1] some of these properties have been obtained from planetary systems not yet corrected with the final/actual value for Newton's gravitational constant 'G' and therefore are not expected to provide and exact value of 1.0 for F_g:F_c

As can be seen from the above table, applying universal factor; 'φ' to the standard atom allows us to use Newtonian mechanics to define the properties and behaviour of sub-atomic particles.

Using Henri Poincaré's formula $E_N = m.v^2$ to convert the above properties to energies:

			Moon-Earth [1]		**Sun-Earth [1]**	
	Planck Atom	**Rydberg Atom**	**Perigee**	**Apogee**	**Perigee**	**Apogee**
φ	4.40742E-40	1	1	1	1	1
E_N (J)	4.43839E+48	4.35974E-18	8.63594E+28	6.75455E+28	5.47030E+33	5.11778E+33
PE_R (J) [2,3]	-4.43839E+48	-4.35974E-18	-8.1367E+28	-7.1960E+28	-5.38100E+33	-5.20473E+33
KE_R (J) [2]	2.2192E+48	2.17987E-18	4.3180E+28	3.3768E+28	2.73516E+33	2.55889E+33

Table 2: Energies
[1] some of these properties have been obtained from planetary systems not yet corrected with the final/actual value for Newton's gravitational constant 'G' and therefore are not expected to provide and exact value of 1.0 for F_g:F_c
[2] whilst these values have been calculated using Rydberg's formulas, the planetary energies can be seen to exactly replicate those for Newton's orbits for the earth and its moon (http://calqlata.com/Maths/Formulas_Orbits.html)
[6] these properties include spin induced energy and therefore vary slightly with Poincaré's formula alone for planets. Planck's and standard atoms do not include the effects of spin

As can be seen from the above Table the energies calculated using Newton's formulas (E_N) replicate the results from Rydberg's (PE_R & KE_R), noting that the universal factor 'φ' is required for the Planck atom. Planck's atom is therefore held together with gravitational force only (i.e does not include not electrostatic).

The following table compares Newton's atom with Planck's atom:

	Formula	Planck (A)	Newton (B)	Ratio A/B
t (s)	$= a_o/c$	5.39096122598358E-44	1.76514516887831E-19	3.05411776948031E-25
λ (m)	$= a_o$	1.61616952231127E-35	5.29177210670000E-11	3.05411776948031E-25
m (kg)	$= m_N$	2.17655000174590E-08	7.12660796350449E+16	3.05411776948031E-25
E (J)	$= m.c^2$	1.95618559889903E+09	6.40507585675677E+33	3.05411776948031E-25
F (N)	$= E/\lambda$	1.21038391820525E+44	1.21038391820525E+44	1

Table 3: Newton's Values

4.3 Conclusions

Newton's laws are universal, i.e. they apply to all orbiting systems irrespective of size. However, whilst you can apply Rydberg's rules to planetary systems (by multiplying the gravitational coupling force by 'φ'), you must first assume that they both carry a charge. You must also assume that the charge held by the sun is equal to the combined charge held by all of its orbiting bodies. To the author knowledge, no such charge has been identified in the earth.

As the above theories are universal, i.e. they also apply to the electron, which is an elementary particle, the author considers it highly likely that Newtonian theory may be applied to all elementary particles and therefore also considers it unlikely that there is a need for the elusive Unification Theory.

5.1 Claims

Claim 1: Newtonian mechanics may be used to describe the behaviour of sub atomic particles (electron, proton and neutron)

Appendices

Appendix 1: Mathematical Constants, Formulas, Symbols & Units

Appendix 1: Mathematical Symbols & Units

Centripetal force: Fc

Newton's gravitational force: Fg

Newton's gravitational constant: G

Force-centre mass: m_1

Orbiting mass: m_2

Separation distance: R

Coulomb's gravitational force: F_e

Coulomb's constant: k

Force-centre elecrical charge: Q_1

Orbiting elecrical charge: Q_2

Velocity of orbiting mass: v

Universal force coupling factor: φ

Newton's gravitational force: $F_g = G.m_1.m_2 / R^2$

Coulomb's gravitational force: $F_e = k.Q_1.Q_2 / R^2$

Centripetal force: $F_c = m_2.v^2 / R$

Universal factor: $\varphi = F_g/F_e$

This paper should be read in conjunction with:
Constants (http://calqlata.com/Maths/Constants.html)
Laws of Motion (http://calqlata.com/Maths/Formulas_Laws_of_Motion.html)
Rydberg Atom (http://calqlata.com/Maths/Formulas_Rydberg_Atom.html)
Planetary Spin (http://calqlata.com/Papers/Spin.pdf)
Planck Atom (http://calqlata.com/Papers/Planck.pdf)
G (http://calqlata.com/Papers/G.pdf)

Refer to CalQlata's **Definitions** (http://calqlata.com/help_definitions.htm) for an explanation of the terms used in this paper