

Relativistic effects are simply changed velocities of Bosons and Fermions. There is nothing relative about relativistic effects. The term relativistic is a misnomer. The scientific expression is now reworded as a gamma factor that depicts loss in energy and hence mass that corresponds with absorption and emission wavelength of light herein for a Hydrogen atom.

THE GAMMA FACTOR - EXACT MEANING OF RELATIVISTIC EFFECTS

The Source of Emitted Light Identified for the H-atom

July 27th 2015

Francis V Fernandes

Reference Data

Bohr radius R of the 1 st orbit R_1 ,	$R_1 = 5.2917721 \times 10^{-11} \text{m}$
Bohr radius R of nth orbit,	$R_n = n^2 R_1$
Bohr electron m_e velocity v of nth orbit,	$v = \frac{nh}{2\pi \times m_e R_n}$
The Gamma Factor γ ,	$\gamma = \frac{c^2 - v^2}{c^2}$
Rydberg photon	$2.425434789 \times 10^{-35} \text{ Kg}$

Let us calculate the Bohr radius R of the 2nd orbit of a H-atom:

$$R_n = n^2 R_1$$

$$R_2 = 2^2 \times 5.2917721 \times 10^{-11} \text{m}$$

$$R_2 = 2.1167088 \times 10^{-10} \text{m}$$

$$q^2 = m r \times 10^7$$

$$(1.60217653 \times 10^{-19})^2 = m \times 2.1167088 \times 10^{-10} \times 10^7$$

$$m = 1.212717419 \times 10^{-35} \text{Kg} = 2 \times 6.063587096 \times 10^{-36} \text{Kg}$$

$$4 \times 6.063587096 \times 10^{-36} \text{Kg} = 2.425434789 \times 10^{-35} \text{ Kg (Rydberg photon)}$$

$6.063587096 \times 10^{-36} \text{Kg}$ corresponds with the $13.6057/4 \text{ eV}$ associated with the 2nd orbit of a H-atom

To arrive at the velocity of an electron in the 2nd orbit,

$$v = \frac{nh}{2\pi \times m_e R_n}$$

$$v = \frac{2 \times 6.6260693 \times 10^{-34}}{2\pi \times 9.1093826 \times 10^{-31} \times 2.1167088 \times 10^{-10}}$$

$$v = 1.093845646 \times 10^6 \text{ m/s}$$

Solving the Gamma factor, $\gamma = \frac{c^2 - v^2}{c^2}$

$$\gamma = \frac{(2.99792458 \times 10^8)^2 - (1.093845646 \times 10^6)^2}{(2.99792458 \times 10^8)^2} = 0.999986687$$

Mass of an electron $m_e = 9.1093826 \times 10^{-31} \text{ Kg}$

Effect of the changed velocity on electron mass is now shown to be what is called **relativistic effect**:

Mass of an electron $m_e 9.1093826 \times 10^{-31} \text{ Kg}$ x the Gamma factor,

$$9.1093826 \times 10^{-31} \text{ Kg} \times 0.999986687 = 9.109261328 \times 10^{-31} \text{ Kg}$$

$$m^* = 9.109261328 \times 10^{-31} \text{ Kg}$$

Orbit 2

The difference in mass between an electron mass measure at light speed c and the changed reduced electron mass at slowed velocity v equals $1.21272 \times 10^{-35} \text{ Kg}$ one fourth the mass of two Rydberg photons that which corresponds to the Bohr radius, $R_2 = 2.1167088 \times 10^{-10} \text{ m}$.

$$9.1093826 \times 10^{-31} - 9.109261328 \times 10^{-31} = 1.21272 \times 10^{-35} \text{ Kg}$$

Orbit 1

The difference in mass between an electron mass measure at light speed c and the changed reduced electron mass at slowed velocity v equals $4.850869578 \times 10^{-35} \text{ Kg}$ the mass of two Rydberg photons that which corresponds to the Bohr radius, $R_1 = 5.2917721 \times 10^{-11} \text{ m}$

$$9.1093826 \times 10^{-31} - 9.108897513 \times 10^{-31} = 4.850869578 \times 10^{-35} \text{ Kg}$$

$2 \text{ eVe} = mv^2$ Two eVe in green represents energy of two photon masses at speed of light squared and in blue the energy of an electron at slowed velocity v , $1.093845646 \times 10^6 \text{ m/s}$

$$2 \times 5.449680303 \times 10^{-15} \text{ J} = m \times (1.093845646 \times 10^6)^2$$

$$m = 9.1093826 \times 10^{-31} \text{ Kg}$$

$\text{eVe} = \frac{1}{2} mv^2$ One eVe in green represents $13.6057/4 \text{ eV}$ corresponding to $2 \times 6.063587096 \times 10^{-36} \text{ Kg}$ and one fourth the mass of two Rydberg photons. In blue the kinetic energy of an electron at slowed locomotion velocity v as it emerges from the H-atom.

2nd orbit Photons corresponding with R_2 :

$$2 \times 6.063587096 \times 10^{-36} \times 2.99792458 \times 10^8 \times \lambda = 6.6260693 \times 10^{-34}$$

$$\lambda = 2 \text{ Pi} \times \{ R_2 \times 137.036 \} \text{ The bracket is an expanded Bohr radius}$$

$$R_2 = 2.1167088 \times 10^{-10} \text{ m}$$

Two Photons rotate 2Pi about radius, R_2 expanded by 137.036

Electron rotates 2Pi around twice the Bohr radius in the 2nd orbit :

$$9.1093826 \times 10^{-31} \times 1.093845646 \times 10^6 \times r = 6.6260693 \times 10^{-34}$$

$$r = 6.649836818 \times 10^{-10} \text{ m} = 2 \text{ Pi} \times 1.0583544 \times 10^{-10} \text{ m} \text{ or } 2 \text{ Pi} \times R$$

An electron mass rotates 2Pi about R which is twice the Bohr radius, $5.2917721 \times 10^{-11} \text{ m}$

INERTIA: A factor of 2

The ratio of $1.0583544 \times 10^{-10}$: $2.1167088 \times 10^{-10} \times 137.036 = u$

$u^2 \times 2$ Electron mass = Rydberg photon mass 2nd Orbit of an H-atom

Or $u^2 \times \frac{1}{2}$ Electron mass = $\frac{1}{4}$ Rydberg photon mass 2nd Orbit of an H-atom

The inertia of $\frac{1}{2}$ electron mass equals the inertia of $\frac{1}{4}$ Rydberg photon mass in the 2nd orbit of an H-atom. Inertia is mass x radius squared.

RELATIVISTIC EFFECT: EMPIRICAL FACTS

The Reason for Absorption and Emission Spectra

The gamma factor which is basically velocity squared change by speed of light squared can be also depicted as,

$$[c^2 - v^2] / c^2$$

Consider an ether wave with a Rydberg photon oscillator at light speed c interacting with the second orbit of an H-atom at 13.6057/4 electron volts,

Energy of the 2nd Orbit : $E = eVe = 13.6057/4 \times 1.60217653 \times 10^{-19} = 5.449680193 \times 10^{-19} \text{ J}$

$E = m v^2 = 5.449680193 \times 10^{-19} = 2.425434789 \times 10^{-35} \times v^2$

$v^2 = 2.246887947 \times 10^{16} \text{ m}^2/\text{s}^2$

$$\gamma = \frac{c^2 - v^2}{c^2} = \frac{8.987551787 \times 10^{16} - 2.246887947 \times 10^{16}}{8.987551787 \times 10^{16}}$$

The Gamma Factor = 0.75

The Rydberg photon mass times the Gamma Factor

$$2.425434789 \times 10^{-35} \text{ Kg} \times 0.75 = 1.819076092 \times 10^{-35} \text{ Kg}$$

$$2.425434789 \times 10^{-35} \text{ Kg} - 1.819076092 \times 10^{-35} \text{ Kg} = 6.06358697 \times 10^{-36} \text{ Kg}$$

The photon $6.06358697 \times 10^{-36} \text{ Kg}$ of the 2nd orbit at light speed squared equals 13.6057/4 electron volts

Apply the de Broglie Equation $m \times c \times \lambda = h$

$$1.819076092 \times 10^{-35} \times 2.99792458 \times 10^8 \times \lambda = 6.6260693 \times 10^{-34}$$

$$\lambda = 1.215022736 \times 10^{-7} \text{ m one of the emission wavelengths of the H-atom}$$

REMARKS

1. A Rydberg photon oscillator in an ether wave arrives at the 2nd Orbit of a Hydrogen atom from the 1st orbit and slows down from light speed c to slowed velocity v .
2. The Gamma factor of 0.75 caused by velocity change and hence energy change is compensated and conserved as an energy loss equal to that of experimentally observed emitted light of a photon $1.819076092 \times 10^{-35}$ at a wavelength of,

$$\lambda = 1.215022736 \times 10^{-7} \text{ m}$$

3. The loss in mass of the Rydberg photon $2.425434789 \times 10^{-35}$ Kg - $1.819076092 \times 10^{-35}$ Kg = $6.06358697 \times 10^{-36}$ Kg yields the energy of the 2nd orbit of the H-atom at speed of light squared.

4. Additional properties of an electron- An electron is a Fermion and a Boson:

Fermion – An electron with kinetic energy at slowed velocity v

Boson - An electron with potential energy at light speed c

5. Additional properties of a photon- A photon is a Boson: Obeys

De Broglie Equation $m \times c \times \lambda = h$

$$q^2 = m \times r \times 10^7$$

6. Photons have mass and are not massless particles. The Rydberg photon and electron have mass.
7. Relativistic Correction is nothing but change in energy caused by change in velocity from velocity v_1 to say velocity v_2
8. The Gamma Factor is change in velocity squared by initial velocity squared
9. Emitted light is necessary to conserve energy changes due to velocity changes
10. Emitted light is necessary to conserve mass changes

Particles in the Orbits of a Hydrogen Atom

In this paper the following empirical evidence is observed:

Rydberg photons [Bosons] at light speed c with fractional mass or twice the mass as with the Bohr Radius, Electrons with Kinetic energy at slowed velocity v [Fermions] and Electrons with Potential energy at light speed c [Bosons].