Note: This powerpoint is approximately 107 slides. The first 15 slides are my pitch to investors while the remaining slides are the claims, data and theory for Blacklight Power.

Zhydrogen

Capitalizing on the biggest energy breakthrough in decades.

Zhydrogen would like to buy a license for a new energy technology invented by Blacklight Power (BLP) and build and sell products based on that technology.

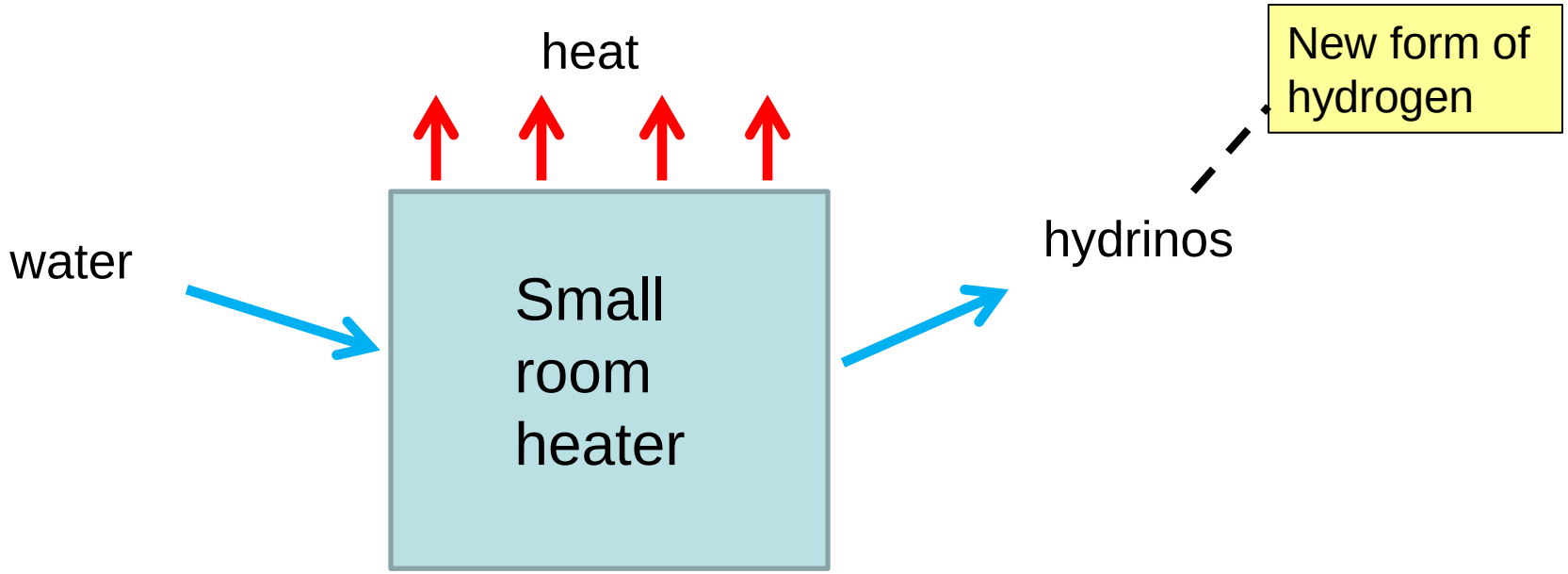
Blacklight Power

- Claims to have found a completely new way of producing energy from hydrogen.
- Energy costs would be lower than natural gas technologies.
- Zero CO_2 emissions.
- Has spent more than $80 million over the past 20 years on their energy technology.
- Has numerous (80+) published scientific papers and books.
- Based in New Jersey.

Zhydrogen

Business Plan

- Buy technology license from Blacklight Power and build products and pay royalties to BLP.
- Develop and sell small heaters and electrical generators (less than 5 kW) to homes and businesses.
- Fastest way to market is to design a small, low cost device.



Zhydrogen

Management team

Jeff Driscoll

- M.S. Mechanical Engineering from University of Massachusetts, Amherst.
- 23 years experience working on various technologies such as wind turbines, pressure sensors and robotics.

Relevant experience:

- Built many experiments involving precise heat flow measurements.
- Followed Blacklight Power's progress over the past 20 years.
- Built replica of Blacklight Power's CIHT device.
- Created website that describes BLP's theory, http://zhydrogen.com

Zhydrogen

Potential market:

BLP's technology would replace all other forms of energy (solar, wind, natural gas, oil etc.).
Energy is a 2 trillion dollar per year market in the USA.
Selling to a small portion of this market would be lucrative.

Financial overview:

Completely self funded at this point. Trying to raise $200,000 or more as a way to get started on the path to building products. The investment needed to get a viable product into the market could be 2+ million dollars.

Blacklight Power's newest discovery:

CIHT

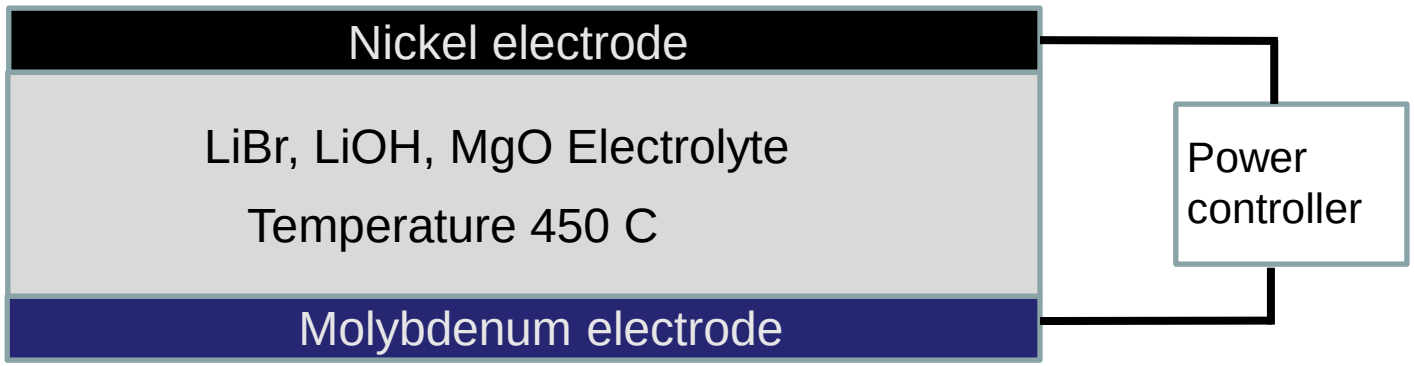
Catalyst Induced Hydrino Transition

Claims

- Molten salt electrolytic cell produces net electrical power with no hydrogen gas added. Just add water.
- Possibly lowest cost of making useful electricity and thermal heat.
- Energy density greater than 1 kw per liter.
- Low cost materials (molybdenum, nickel, lithium bromide, magnesium oxide).

Input:
water vapor

Output:
hydrinos and electrical energy



Electrolyte:
- lithium bromide
- lithium hydroxide
- magnesium oxide

Construction is similar to high temperature hydrogen fuel cells currently sold.

Blacklight Power's CIHT

CIHT
Catalyst Induced Hydrino Transition

BLP had CIHT validated by 6 independent individuals and teams, including:

- California Institute of Technology professor who advises technology companies.
- Industry expert with MIT PHD degree in chemical engineering that managed R&D for brand name companies including battery and fuel cell development companies.
- Team from a fortune 500 firm consisting of an expert R&D manager, a PHD physics/ DOD advisor and a PHD chemist with fuel cell experience.
- Professor with expertise in materials science and batteries.
- Defense company with 25 research electrochemists that manufacture missile batteries for the defense department.

CIHT
Catalyst Induced Hydrino Transition

Six independent validation teams examined BLP's CIHT device, took measurements and even took part in building some devices.

- They wrote positive reports regarding their observations.
- Names, resumes and reports from these validation teams at: http://blacklightpower.com/technology/validation-reports

Independent validation team

Dr. Terry Copeland who has a PhD in chemical engineering and from 1992 to 1995 he served as Duracell battery's director of engineering for North America.

He writes the following in his report:
"*In summary BLP has successfully fabricated and tested CIHT cells capable of producing net electrical output of up to 50 times that input to maintain the process. Some cells have produced steady power for over one month. The power generation is consistent with Dr. Mills theory of energy release resulting from hydrino formation. No other source of energy could be identified.*"

source:
http://blacklightpower.com/technology/validation-reports

CIHT
Catalyst Induced Hydrino Transition

Independent validation team

Another report was written by Dr. Henry Weinberg who was a professor of chemical engineering and chemistry at the University of California, Santa Barbara and he writes in his report:

"*To summarize, when first hearing of the claims of BLP it would be irrational not to be very skeptical, and prior to meeting Randy Mills I was extremely skeptical. However, after visiting BLP, having participated in experimental design and execution, and having reviewed vast amounts of other data they have produced, I have found nothing that warrants rejection of their extraordinary claims.*"

Independent validation team

Dr. Nick Glumac is a professor of mechanical science and engineering at University of Illinois, Urbana-Champaign and he writes in his report:

"*Based on my visit to BLP in December 2011, I saw no significant flaws in the approach used by BLP with regards to the CIHT cells. Experiments were performed carefully and in a repeatable fashion. Appropriate precautions to avoid experimental bias were taken*".

source:
http://blacklightpower.com/technology/validation-reports

CIHT
Catalyst Induced Hydrino Transition

Independent validation team

Dr. Ramanujachary, is a professor in the chemistry and biochemistry department at Rowan University and he writes in his report:

"*The excess electricity observed was consistent with the electrochemical production of low energy form of hydrogen providing the energy source. Indeed the electrical energy out surpassed by multiples the electricity required to generate the hydrogen fuel from water.*

source:
http://blacklightpower.com/technology/validation-reports

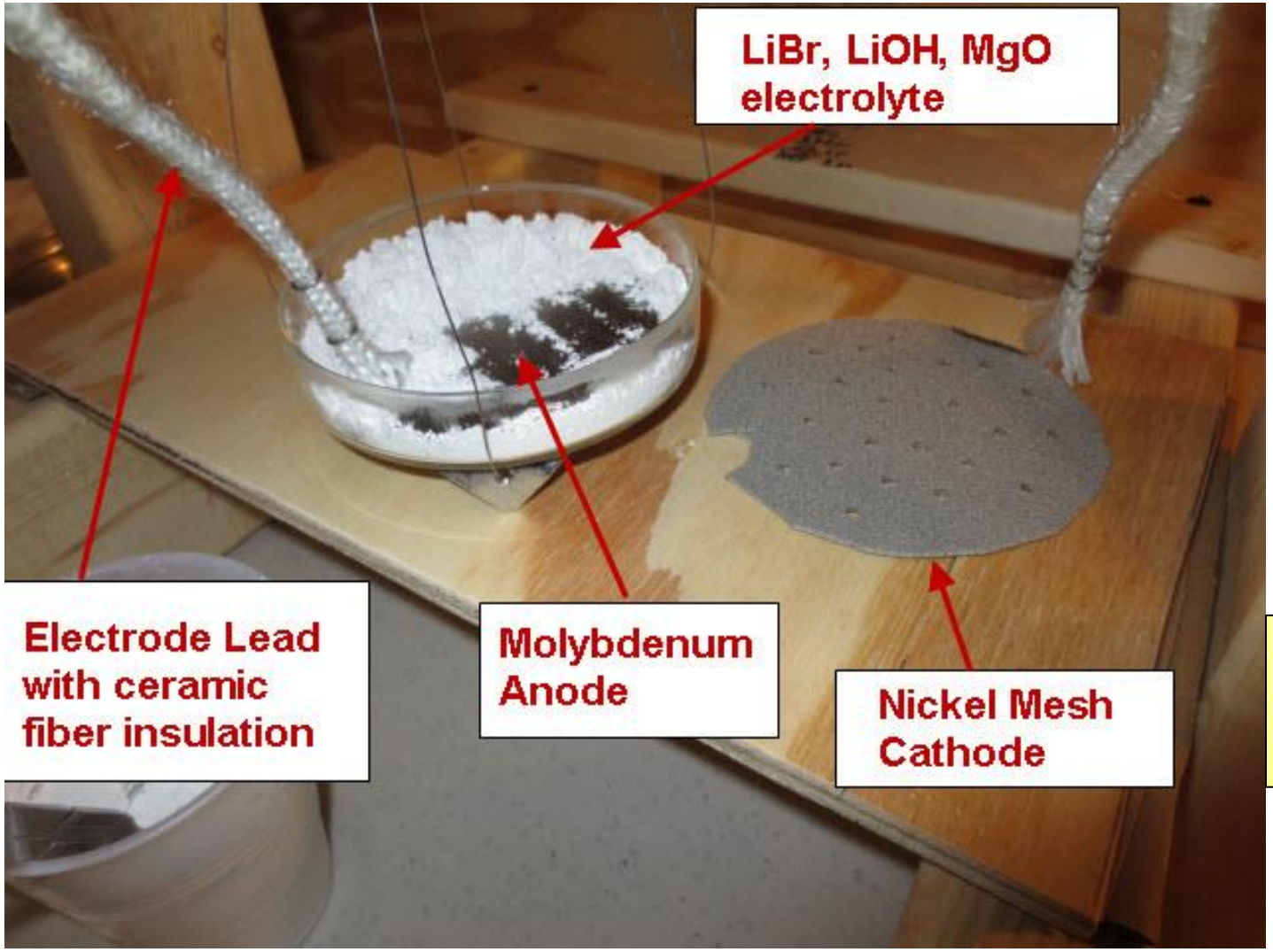
Zhydrogen

The next few slides show my attempt at replicating BLP's CIHT device. At the moment it needs design changes since the initial experiments were not successful. A full report on this experiment can be found at:

http://zhydrogen.com/?page_id=620

CIHT
Replication
Experiment
(J. Driscoll, 2013)

Zhydrogen

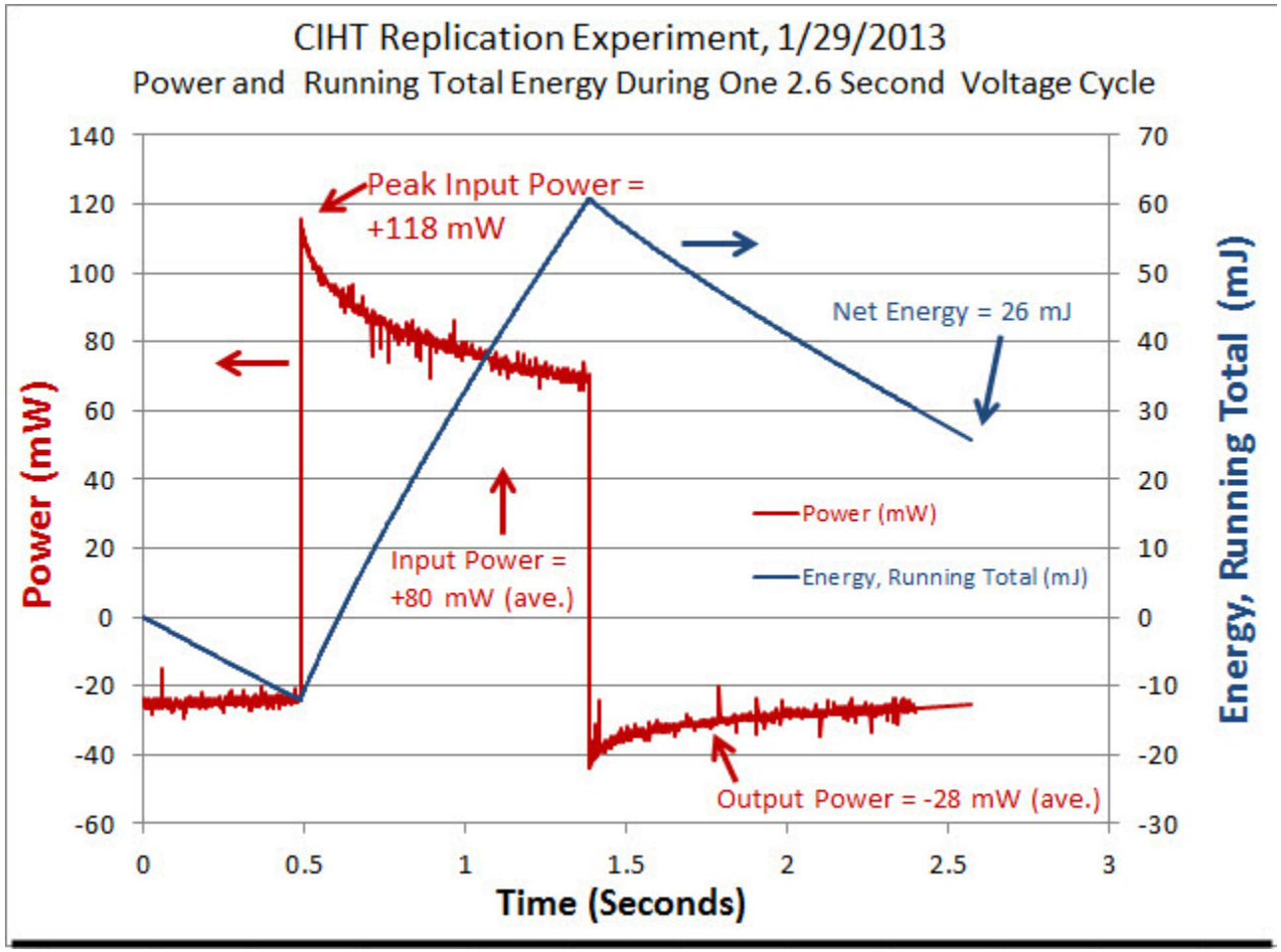


status:
incomplete
results

CIHT
Replication Experiment (J. Driscoll, 2013)

details at
http://zhydrogen.com

Zhydrogen



status: incomplete results

CIHT
Replication Experiment (J. Driscoll, 2013)

details at http://zhydrogen.com

Zhydrogen

I created a website that describes details of BLP's theory which can be found here:
http://zhydrogen.com

Website is a beginner's guide to Blacklight Power and Randell Mills's theory of the atom.

I (Jeff Driscoll) am not affiliated with Blacklight Power.

Blacklight Power's website:
http://blacklightpower.com

End of investor pitch slides.

Remaining slides are details on the claims, data and theory for Blacklight Power.

Blacklight Power Claims / Facts

Blacklight Power

• Claims to have found a new way of producing energy from hydrogen that would result in home heaters that have no fuel costs.

• Has spent more than $80 million over the past 20 years on their energy technology.

• Has numerous (80+) published scientific papers and books.

• Blacklight Power has a technology that is safe and 100% green where the yearly cost to power a house would be a fraction of what it is now.

•Thermal output far above any conventional chemical explanation for the source of energy.

•Claims newest discovery, CIHT (Catalyst Induced Hydrino Transition), generates electricity with an output energy greater than 100X of input energy.

•6 separate teams/individuals have validated BLP's CIHT discovery. These teams come from academia and relevant industries.

Blacklight Power Claims

•Hydrogen atom is converted into what they term a “hydrino” and releases energy. Electron in hydrino has smaller orbit radius than conventional hydrogen.

•Creation of hydrino releases 200 times more energy than that required to produce Hydrogen from splitting water into hydrogen and oxygen.

•One method of creating hydrino is to have hydrogen in contact with Potassium or Sodium at high temperatures (300 C or higher) during a solid to gaseous phase transition.

•Claims that dark matter, which makes up 84% of all matter in the Universe is possibly hydrinos.

•Acceleration of Universe occurs when atomic hydrogen in gas clouds in outer space convert to hydrinos which release radiation and kinetic energy and cause space to expand.

•Standard Quantum Mechanics (SQM) has many problems (infinities etc.) that are solved with Randell Mills’s Classical Quantum Mechanics (CQM) which is based on first principles.

Example of one of BLP's thermal type experiments:

A mixture of sodium hydroxide (NaOH) and nickel, when heated, releases more energy out than can be explained by conventional chemistry.

Output energy = 2149 kJ

Input energy (electric heater) = 1396 kJ

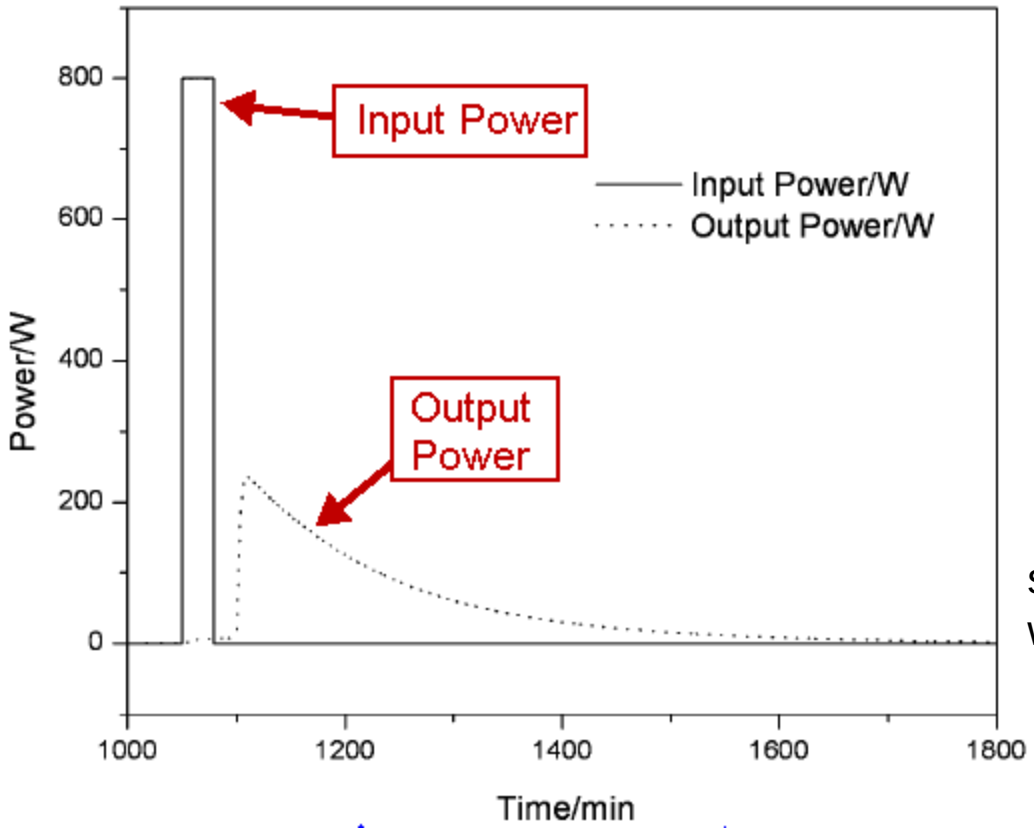
Excess energy = 753 kJ (because 2149 – 1396 = 753)

Conventional chemistry explains a negligible amount of this 753 kJ.

- Less than 1% of hydrogen was converted into hydrinos in this experiment which means that the other 99% of the hydrogen could be converted to hydrinos in a new run.
- Sodium and hydrogen need to be regenerated back to sodium hydroxide before starting another run.

Energy released from 1 kg of NaOH doped Raney Nickel equaled 753 kJ. Plot of input power and output power.

Figure 22. The coolant power with time for the hydrino reaction with the scale-up cell containing the reagents comprising the catalyst material, 1kg *NaOH* -doped R-Ni 2400. The numerical integration of the input and output power curves with the calibration correction applied yielded an output energy of 2149.1 kJ and an input energy of 1396 kJ corresponding to an excess energy of 753.1 kJ.



source: www.blacklightpower.com

Power output versus input in BLP's experiment.

Hydrino creation

In a Hydrogen atom, the electron falls to a lower orbit state previously unknown, releasing thermal and electromagnetic energy and forming a hydrino.

- Energy released only in multiples of 27.2 eV (electron volts) i.e. 27.2 eV, 54.4 eV, 81.6 eV, 109 eV …
- Occurs through a radiationless resonance energy transfer known as Forster Resonance Energy Transfer or FRET.
- FRET is a widely accepted theory in science and is an energy transfer mechanism between atoms during close contact.
- Energy transfer is from hydrogen to another atom or molecule that has electron ionization or bond dissociation energies that sum to exactly some multiple of 27.2 eV (within a small percentage).
- Releases thermal kinetic energy and continuum radiation (i.e. the photon has a range of of frequencies within a single photon).

A consequence of continuum radiation is that the “smoking gun” signal for hydrino creation can be buried and hard to see in the spectrum data obtained from experiments.

Problems with Standard Quantum Mechanics (SQM) but solved with Randell Mills's Classical Quantum Mechanics (CQM)

Standard Quantum Mechanics (SQM)	**Classical Quantum Mechanics (CQM), Randell Mills**
Electron in Hydrogen atom has infinite angular momentum at orbit state n = infinity and an angular momentum equal to n multiplied by reduced Planck constant (or hbar) at all other states.	Electron in hydrogen atom always has one unit of angular momentum at all orbit states and is equal to the reduced Planck constant (or hbar).
Does not explain why bound electron does not radiate electromagnetic energy and spiral down into the nucleus.	An extended distribution of accelerating electric charge (i.e. covering a spherical surface) does not have to radiate.
Stern Gerlach experiment is not explained by SQM which needs a correction factor (g-factor) and an intrinsic spin (spin quantum number).	CQM explains Stern Gerlach experiment without fudge factor and only using first principles. Spin quantum number is eliminated.
The electron is everywhere at the same time according to a probability curve.	The electron has a definitive shape, location and velocity.
Has no real world interpretation for the atom in the macroscopic world. Spin, angular momentum etc.	Based on first principles (i.e. based on electrodynamics and Newton's equations)
Schrodinger equation does not predict the electron magnetic moment or the spin quantum number.	CQM calculates the electron magnetic moment and eliminates need for the spin quantum number.

Blacklight Power Theory

Standard Accepted Theory

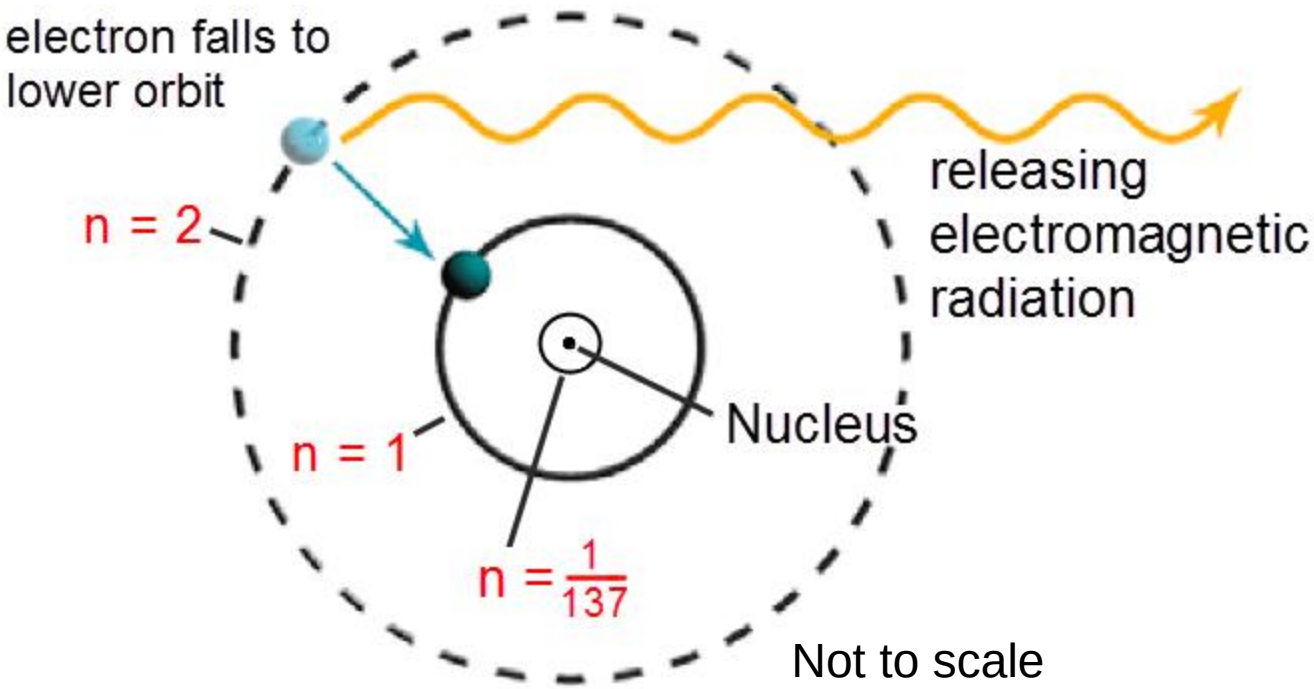
Electron falls from higher orbit state to lower orbit state and emits electromagnetic radiation. Lowest principal orbit state is $n = 1$.

Randell Mills's Theory

Electron falls from higher orbit state to lower orbit state and emits electromagnetic and thermal kinetic energy. Lowest orbit state is

$n = {}^{1}/_{137}$

Fractional orbits are allowed, i.e. ($n = {}^{1}/_{2}, {}^{1}/_{3}, {}^{1}/_{4} \ldots {}^{1}/_{137}$).



In Mills's model, the formula for energy emitted by hydrogen between initial orbit state n_i and final orbit state n_f is

$$\boxed{\Delta E = 13.598\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right)}$$

Total energy released in eV

final orbit state

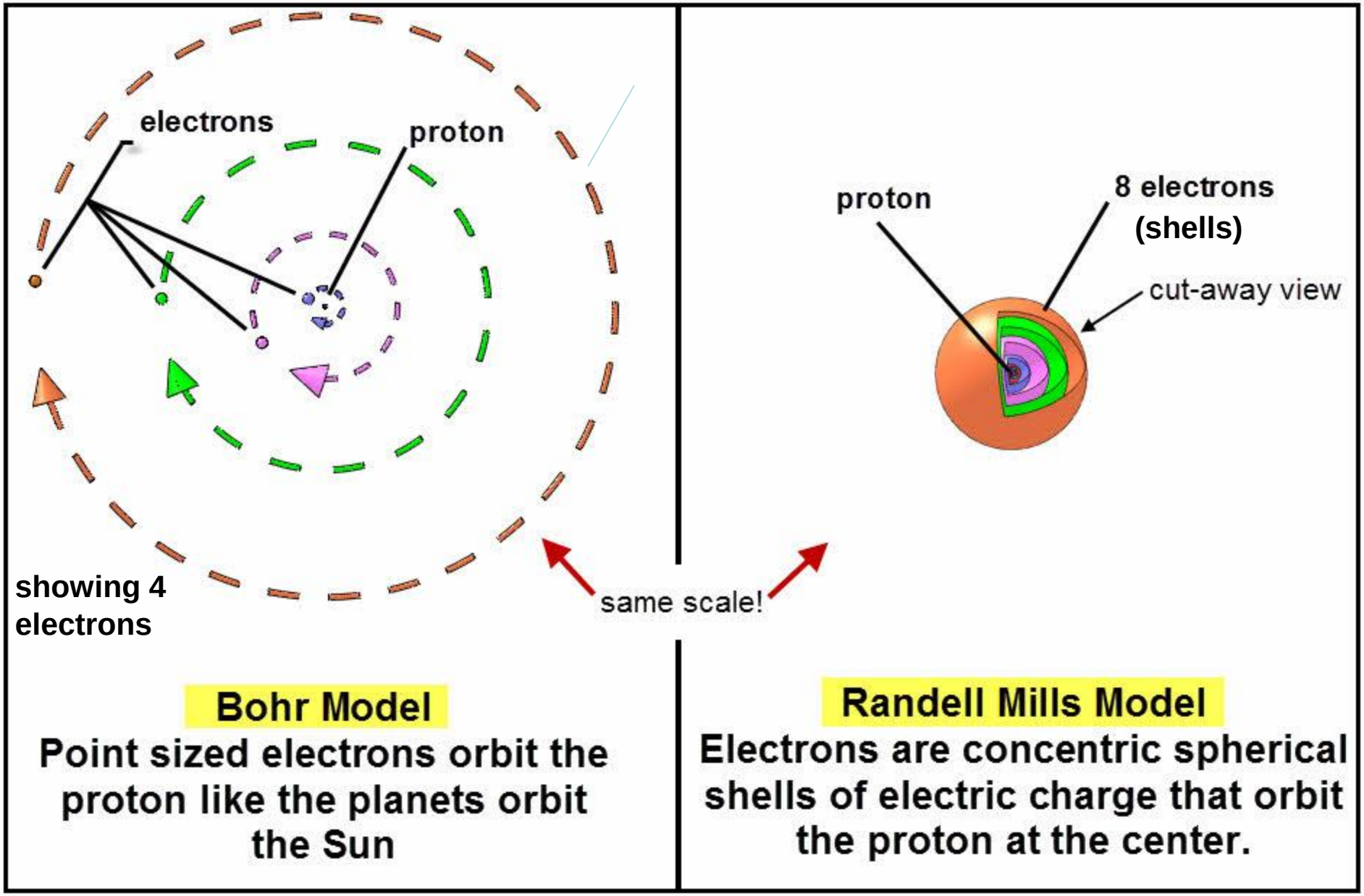
initial orbit state

$$\text{where } n = \begin{cases} \frac{1}{2}, \frac{1}{3}, \frac{1}{4} \ldots \frac{1}{p} & \text{and } p \leq 137 \\ 1, 2, 3 \ldots \text{infinity} \end{cases}$$

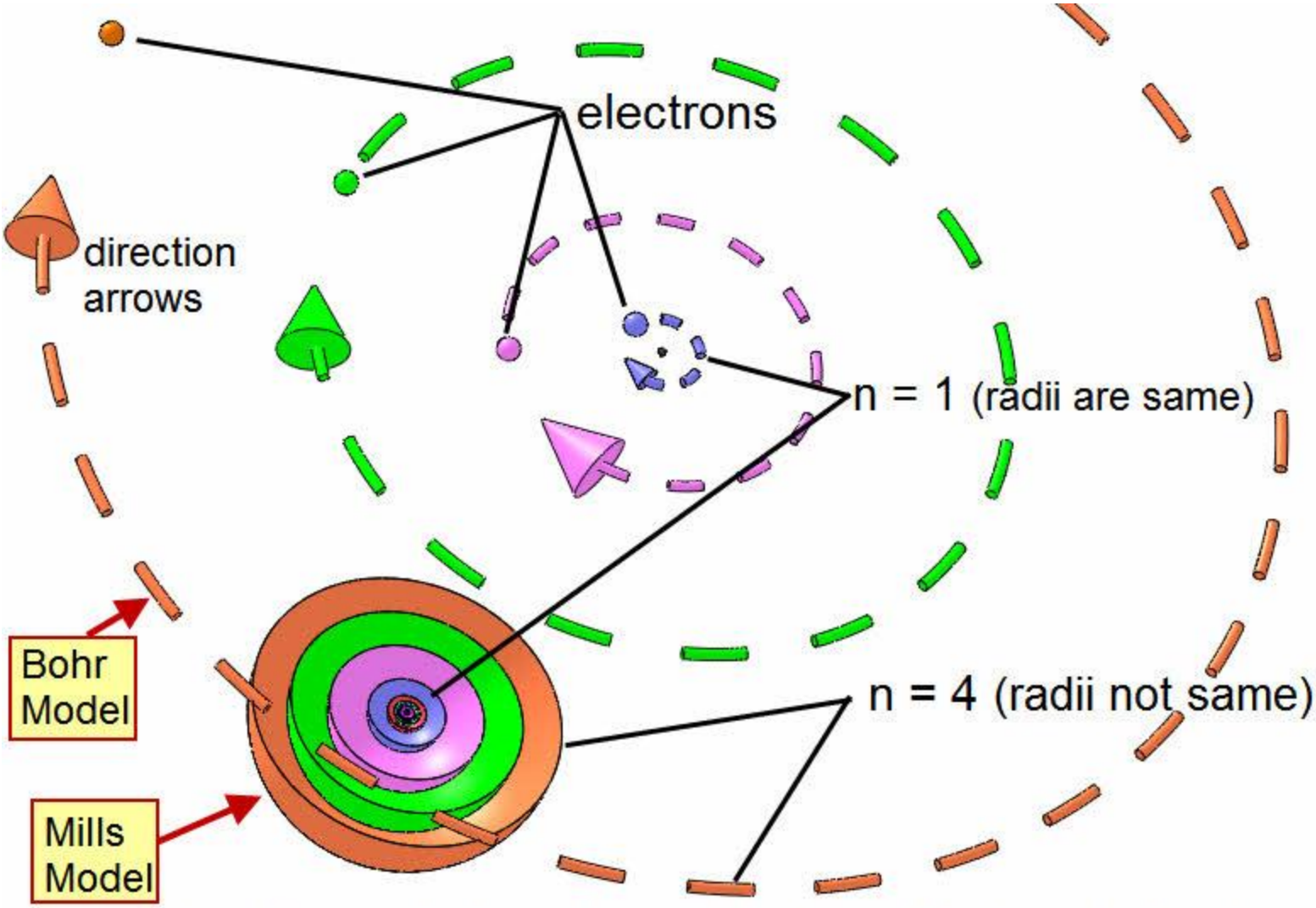
For final orbit states $\mathbf{n_f}$ greater than or equal to 1: All energy is released is in the form of a photon.

For final orbit states $\mathbf{n_f}$ that are fractional numbers: Energy released includes photon energy and thermal kinetic energy.

Note: The Bohr Model uses the same equation above except the Bohr model does not allow fractional orbit states (i.e. n = 1/2, 1/3 etc are not allowed)



Note: For hydrogen, the electron is only in one of the orbits shown above.



At orbit state n = 4, the radius of the Bohr Model orbit is 4 times larger than the Mills Model at the same orbit.

Bohr Model radius $r = \underline{n}^2 a_0$ ← $\underline{n}$ is squared

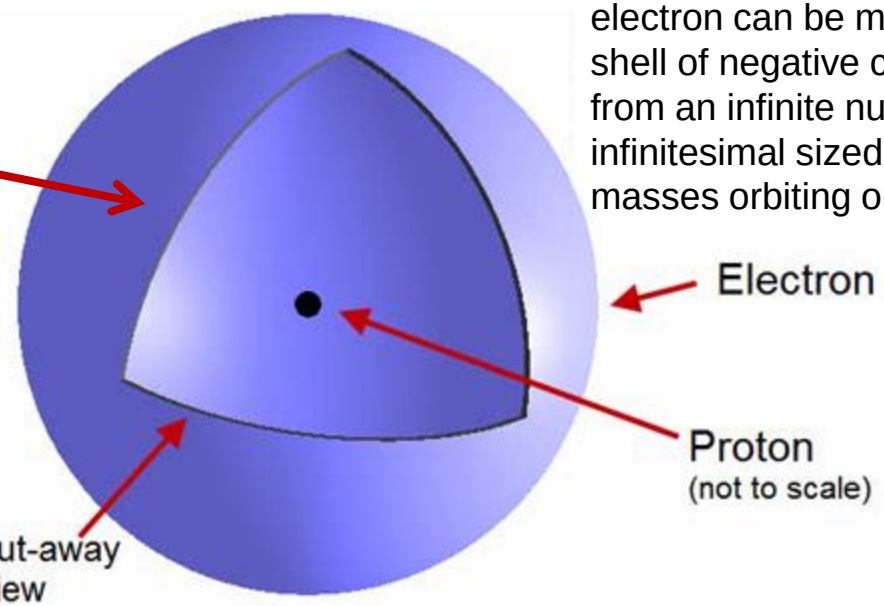
Mills Model radius $r = \underline{n}\, a_0$ ← $\underline{n}$ is not squared

Definition of the Electron Orbitsphere (for the hydrogen atom with one electron orbiting one proton):

In GUTCP, the electron orbitsphere is a spherical shaped thin shell of negative electric charge that surrounds the positive proton at the nucleus. Charge currents orbit on an infinite number of circular paths around this sphere and the sum of the charge currents amounts to the charge of an electron, -1e (or -1.6021 X 10^{19} Coulombs).

electron can be modeled as a shell of negative charge made from an infinite number of infinitesimal sized charges and masses orbiting on great circles

Trapped photon (not shown) inside infinitely reflective sphere



radius: $r = na_0$

Electron Orbitsphere
(bound to proton)

stable (allowed) orbit states:	$n = 1,2,3 \ldots$ infinity	(normal hydrogen)
	$n = \frac{1}{2}, \frac{1}{3}, \frac{1}{4} \ldots \frac{1}{p}$ where $p \leq 137$	(hydrinos)

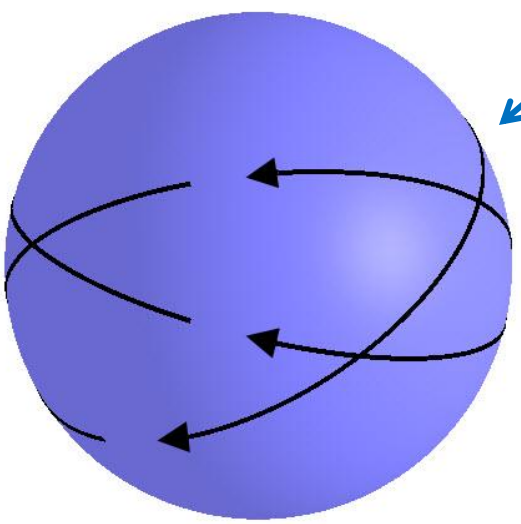
Electron Orbitsphere

- Electron is a shell of electric charge surrounding the proton nucleus (or a positron).
- Can be <u>modeled</u> as an infinite number of infinitesimal sized charge currents that orbit on circular paths ("great circles") around the proton (or around the positron).
- The transition state orbitsphere (TSO) is a special case of the electron orbitsphere with the positron (not the proton) providing the central electric field which gives the spherical shape.

<u>Analogy used in the mathematical model</u>:

Break an electron into an infinite number of infinitesimal pieces of mass and charge and have each piece orbit on an infinite number of "great circles" of a sphere.

In the model, each infinitesimal charge and mass is in force balance.



3 randomly drawn great circles

Each infinitesimal point charge and point mass orbits with the <u>same</u> velocity **v** and angular frequency ω on each great circle.

electron orbitsphere

Easiest way to understand Randell Mills's theory is to start with understanding the Bohr Model.

Bohr Model

- First introduced by Niels Bohr in 1913
- Gave equations that calculated the wavelength of light emitted from the Hydrogen atom with an accuracy better than 0.06%
- Adding the "Reduced Mass" correction results in an accuracy of better than 0.003% !

That error is 1 part in 30,000 or the width of a human hair compared to 8 feet!

Mills's model of atom: radius of electron orbit, $r = n\,a$

Bohr Model of atom: radius of electron orbit, $r = n^2\,a$

Given that the radii are different between the two models (Mills and Bohr)…

How can the final light emission equations look the same if the Kinetic Energy and thus the velocity of the electron is the same in both models for a given quantum state n?

Answer: Mills's model has a different electric field between the electron and the proton equal to e/n (caused by the "trapped photon") while the Bohr Model has an electric field of just e. Also Mills's model has a different equation for the radius $r = n\,a_0$

Bohr Model

electron velocity

$$v = \sqrt{\frac{k_e \boxed{e^2}}{m \boxed{r}}}$$

$e \times e = e^2$

(Electric field x electric charge $= e^2$)

$r = n^2\,a_0$

Mills's Model

electron velocity

$$v = \sqrt{\frac{k_e \boxed{e^2}}{m \boxed{r}}}$$

$\frac{e}{n} \times e = \frac{e^2}{n}$

(Electric field x electric charge $= \frac{e^2}{n}$)

Includes field due to trapped photon

$r = n\,a_0$

Item	Bohr Model	GUTCP Model	Notes
radius	$r = n^2 a_0$	$r = n a_0$	$a_0 = .0529$ nm
radius at n = 1/2	Not applicable	$\frac{a_0}{2}$	Fractional orbits allowed for Mills only
radius at n = 1	a_0	a_0	
radius at n = 2	$4a_0$	$2a_0$	
Electric field factor between proton and electron	1	$\frac{1}{n}$	factor is **1/n** in GUTCP due to trapped photon
bound electron	orbiting point particle	extended distribution of charge	
orbit motion	planetary	orbit on “great circles”	
angular momentum	equal to $n\hbar$	equal to $\hbar$ at all orbit states n	$\hbar$ = reduced Planck’s constant
Trapped photon	none	yes	contributes to electric field between electron and proton

Why do the equations for the Bohr Model and Randell Mills's model look the same?

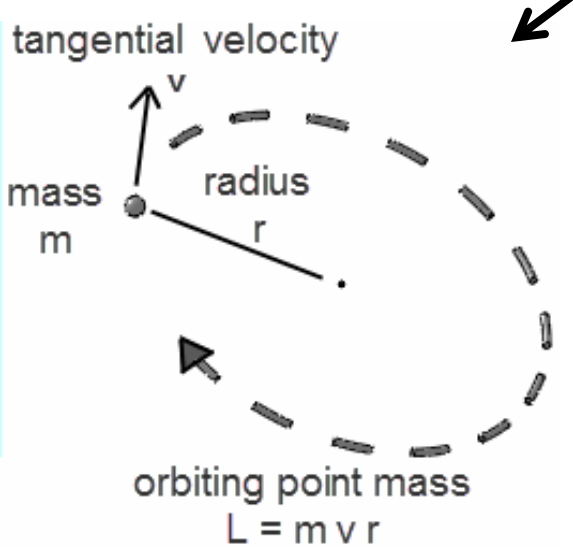
Bohr Model - Planetary model, electrons orbit proton same as the moon orbits the earth.

Randell Mills model - Infinite number of infinitesimal point charges (and point sized masses) orbit the proton on great circles, creating a shell of electrical charge.

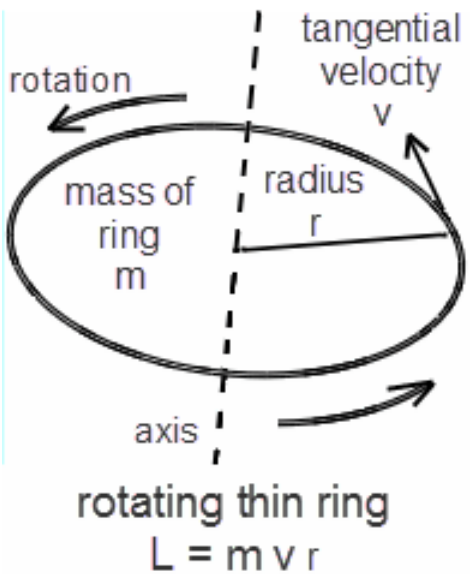
Equation for angular momentum "L" of a ring (Mills) is the same as the angular momentum of an orbiting point particle (Bohr). Angular momentum: $L = m v r$

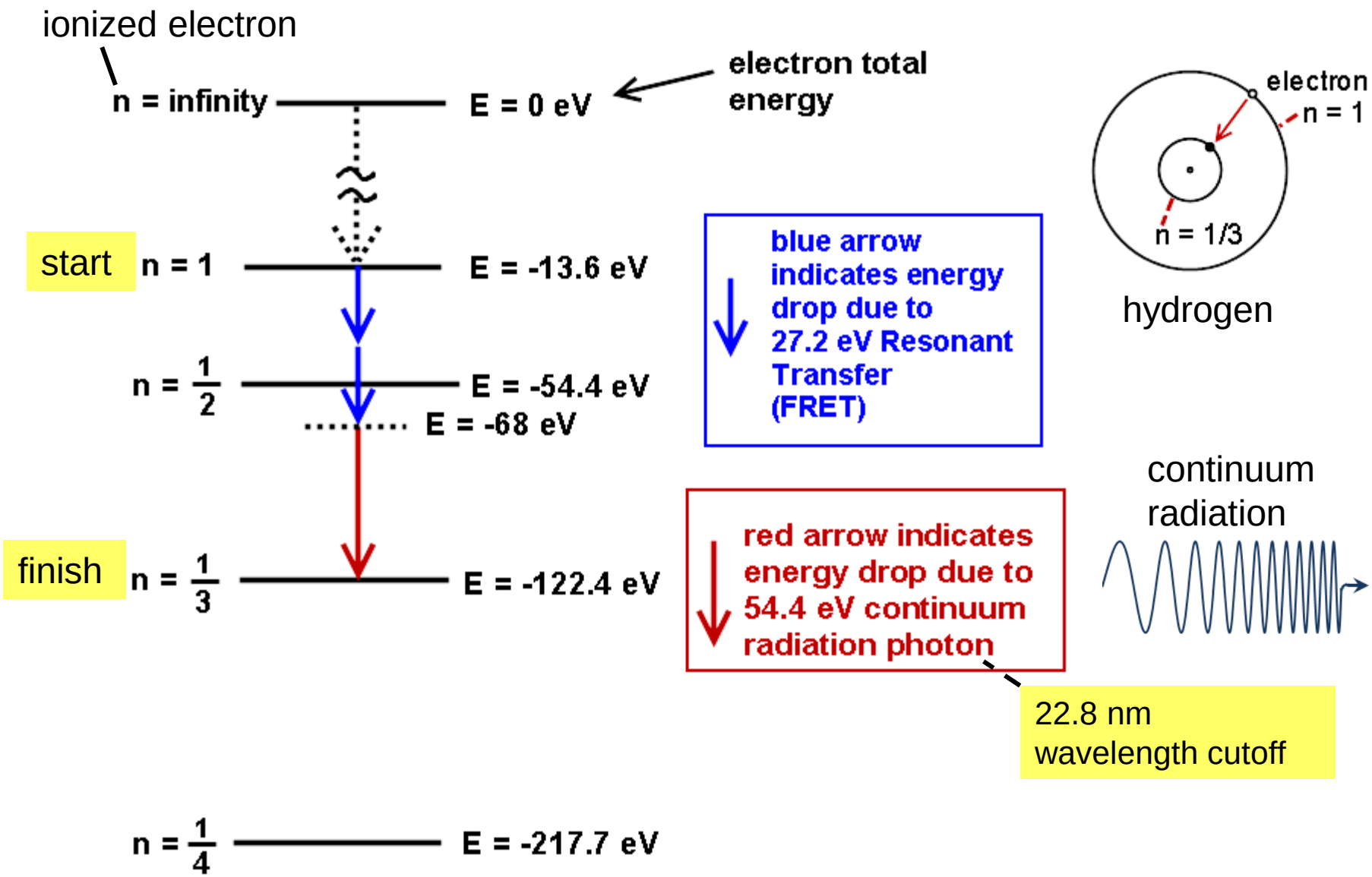
Final equations for the wavelengths of the emitted light during orbit transitions are the same in both models.

Bohr's point particle model

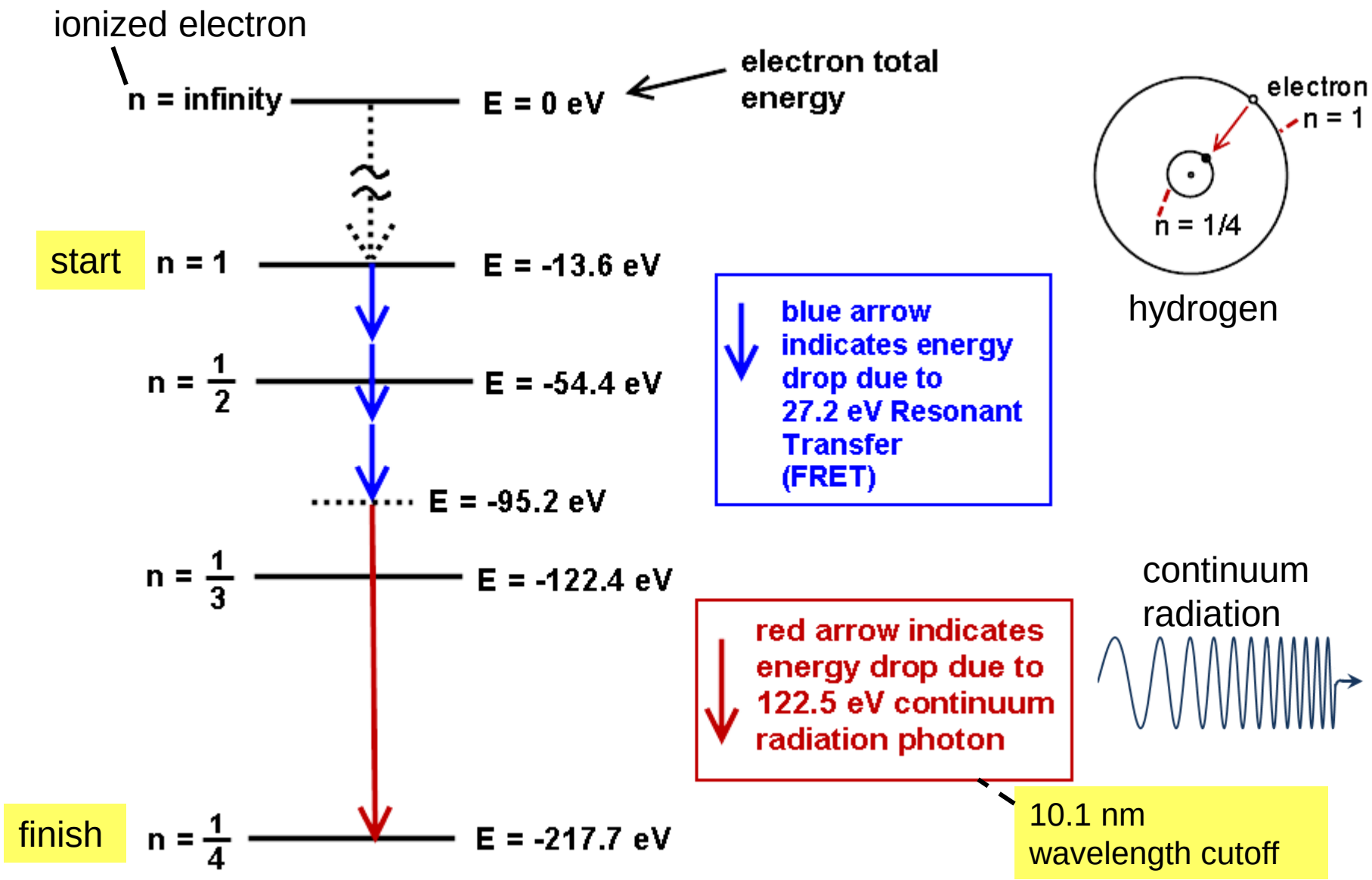


Mills's great circle model





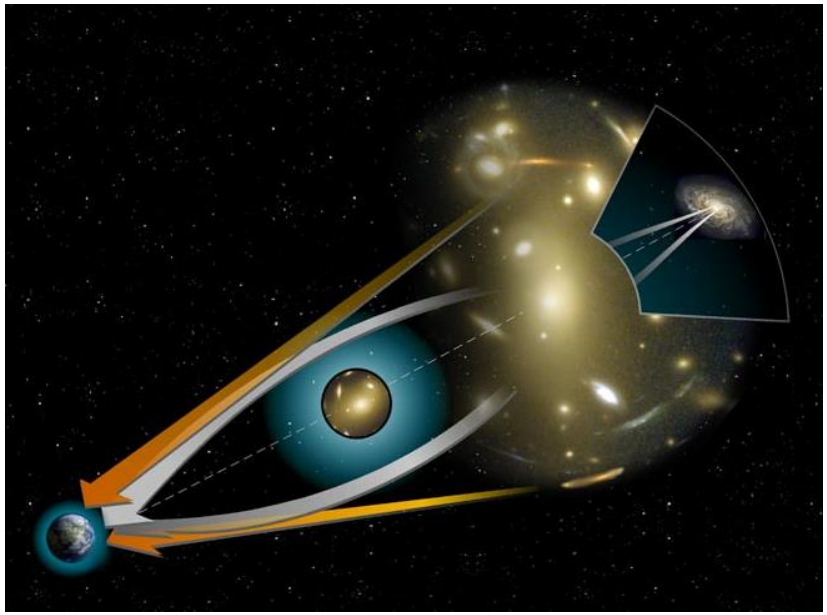
Hydrogen atom with electron at n = 1 orbit state dropping to the n = 1/3 state. Releasing 54.4 ev (2 x 27.2 eV) in resonant transfer energy and a 54.4 eV continuum radiation photon.

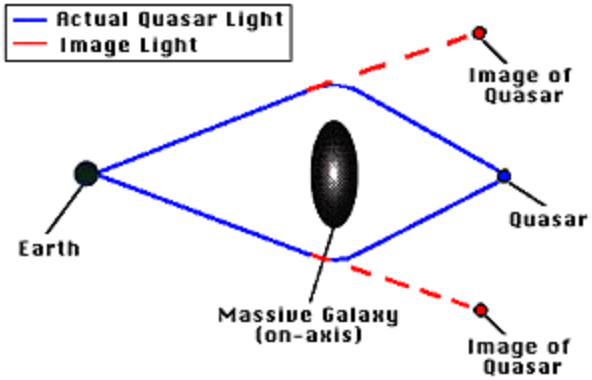


Hydrogen atom with electron at n = 1 orbit state dropping to the n = 1/4 state. Releasing 81.6 ev (3 x 27.2 eV) in resonant transfer energy and a 122.5 eV continuum radiation photon.

Blacklight Power Cosmology

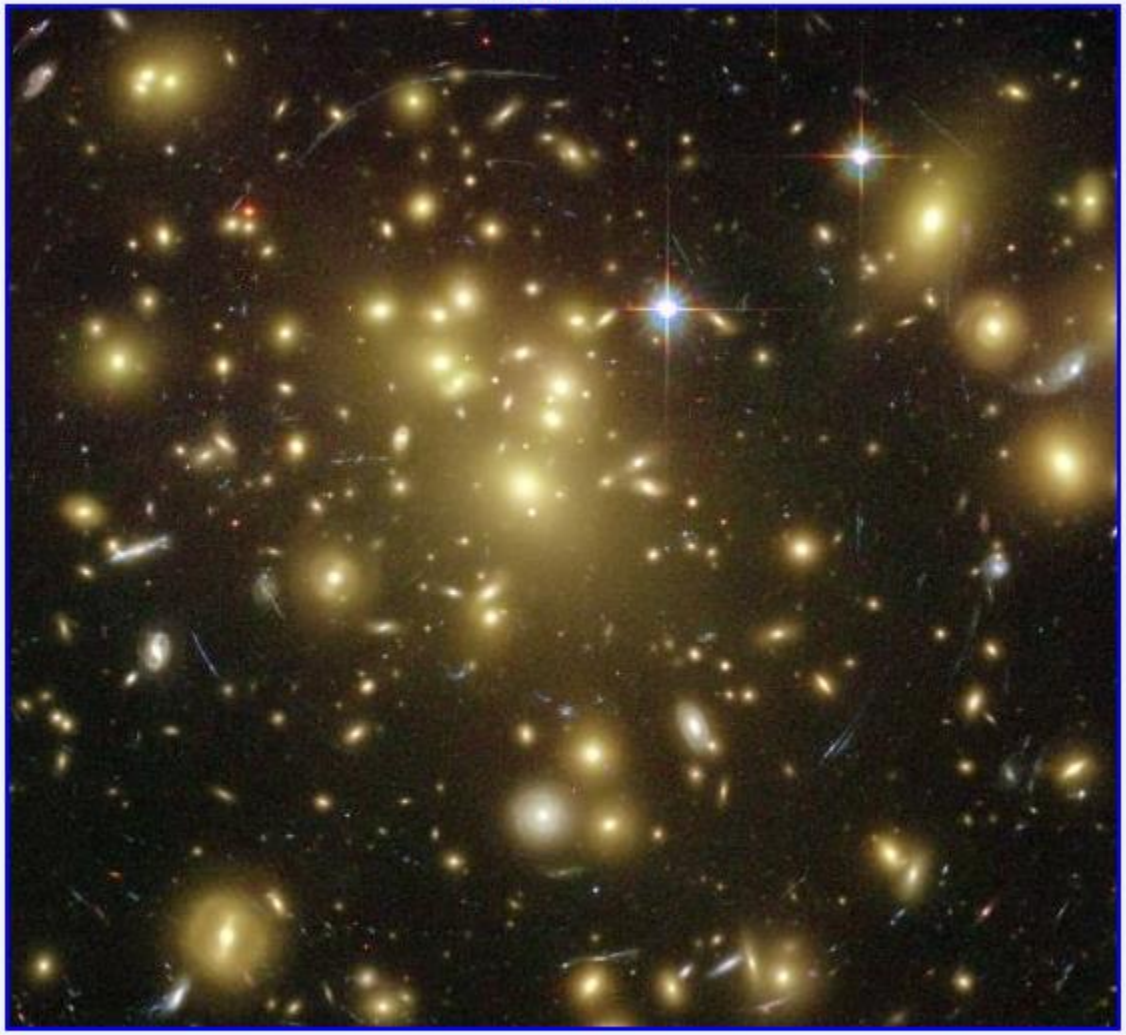
Randell Mills's Theory explains the following cosmological observations	
Dark Energy	Creation of hydrinos converts mass to radiation and causes the Universe to expand at an accelerating rate. Universe will stop accelerating in 500 billion years and then start collapsing at an accelerating rate. Mills predicted that the universe was accelerating in 1995 and this was confirmed in measurements around 1999 giving those scientists, but not Mills, a Nobel Prize.
Dark Matter	Dark Matter makes up 84% of all matter in the Universe. Hydrinos do not interact with radiation and therefore are "dark".
Sun's corona	Sun's corona (outer layer) has a temperature greater than 1 Million Kelvin while the surface temperature is only about 6000 Kelvin.
Warm Interstellar Medium	Some thermal heat in galactic clouds comes from creation of hydrinos.





Dark Matter creates gravitational lensing.

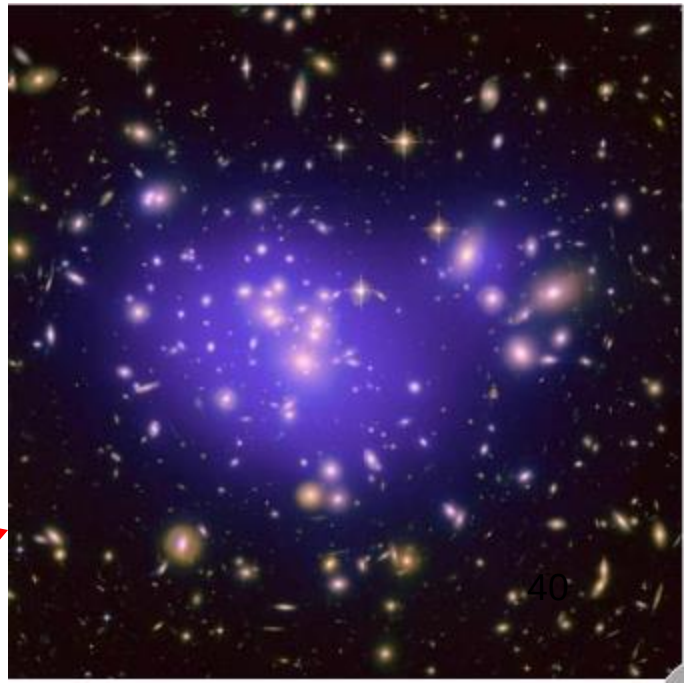
2004 June 27



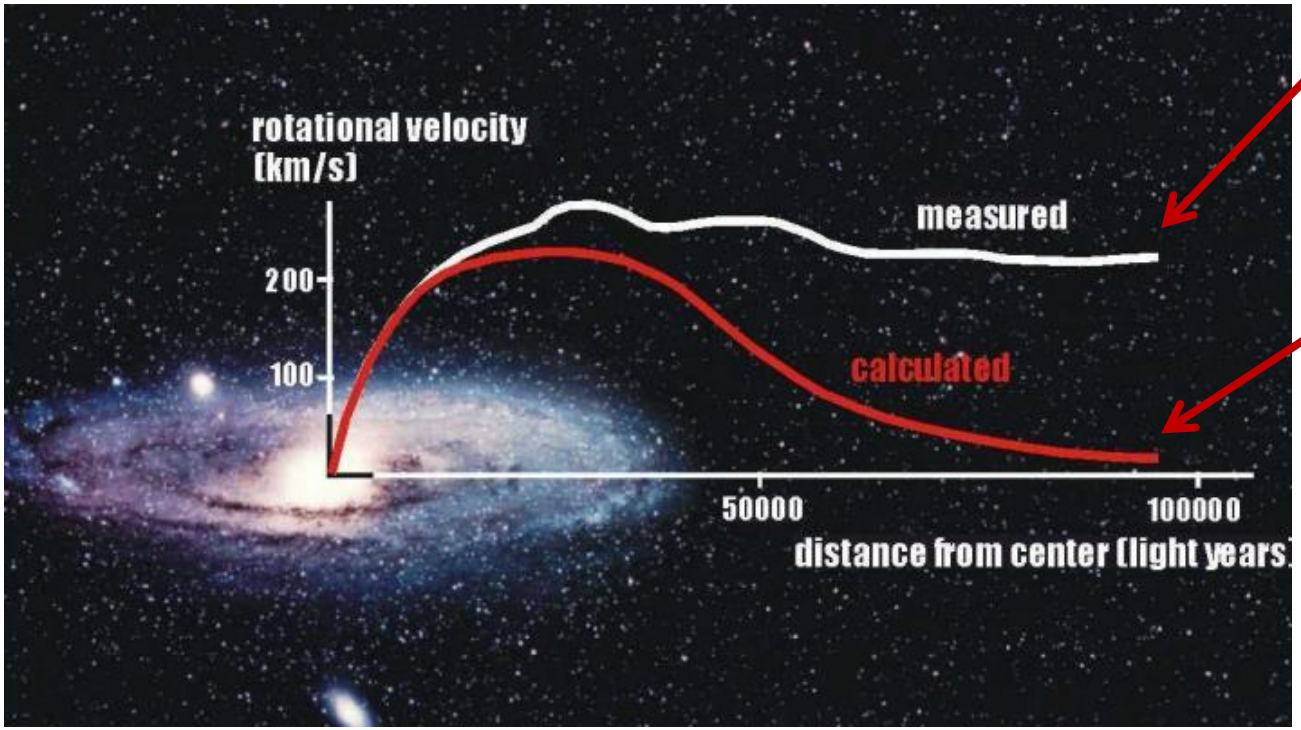
Galaxy Cluster Abell 1689 Warps Space

Gravitational lensing due to dark matter

Yellow / tan galaxies are all in one common galactic cluster having a large fraction of its mass in dark matter. Blue / whiter arc shaped streaks are galaxies much further away that get the arc shape through gravitational lensing.



Bluish tint is computer generated overlay map of the dark matter (both photos are the same picture of Galaxy Cluster Abell 1689).



Actual velocity. Means some mass must be invisible

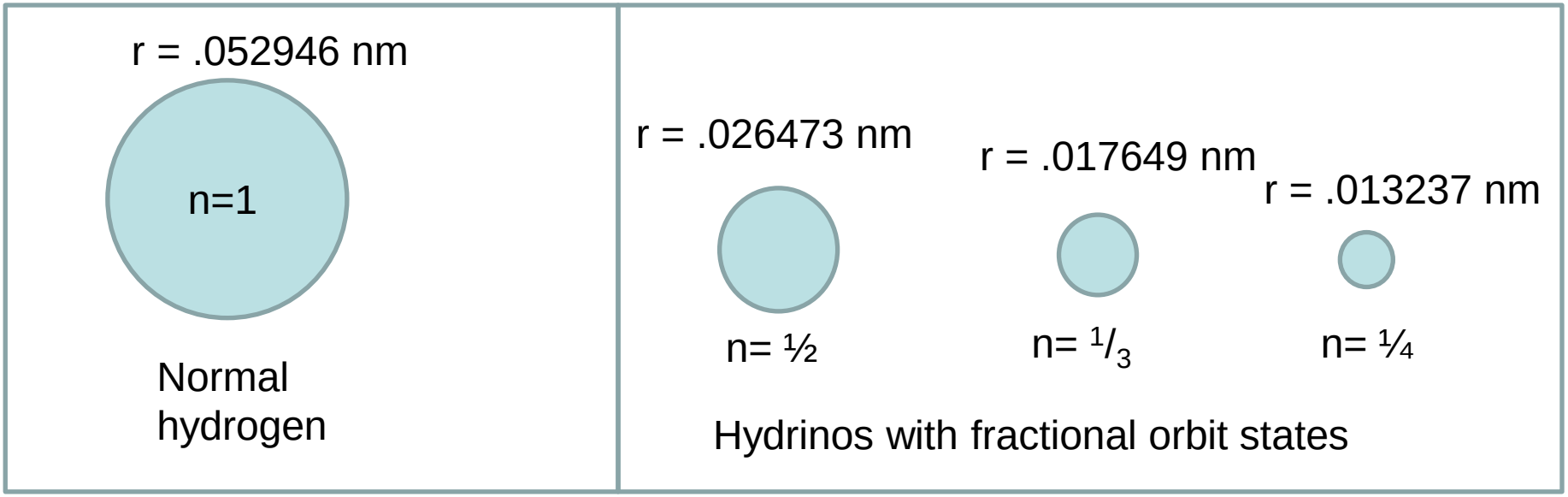
calculated velocity based on visible mass

Dark Matter causes galaxies to rotate faster at the outer edges.

Based on the emitted light (from all of the electromagnetic spectrum), the galaxy should be rotating slower and the higher velocity indicates there is invisible matter (i.e. dark matter) surrounding the galaxy.

Blacklight Power Hydrinos

Hydrinos are hydrogen with a smaller radius than previously known to exist.



Energy released during creation of a hydrino at the n = ¼ state is 200 times greater than the energy needed to make hydrogen from water.

Note: Radii above include reduced mass correction.

Creating hydrinos

Need:

1. Monatomic hydrogen
2. Contact with another atom or molecule that can accept exactly some multiple of 27.2 eV in the form of ionization of electrons or atomic bond dissociation energy.

But, typically on earth…

- Hydrogen is diatomic (i.e. H_2).
- Hydrogen is bound up in a solid or liquid, (i.e. H_2O, plastics, methane, oil etc.)

Therefore, conditions for making hydrinos are rare and the hydrinos are not easy to detect - especially if they are not being looked for.

Hydrino creation

Step 1

Donor monatomic hydrogen transfers some multiple **m** of 27.2 eV (i.e. **m** x 27.2 eV) to an Acceptor in a radiationless, coulombic dipole/dipole resonant energy transfer similar to a FRET process (Forster Resonant Energy Transfer).

Acceptor must have any of the following types of energies that exactly sum to a multiple of 27.2 eV:

1. Electron ionization energy
2. Bond dissociation energy

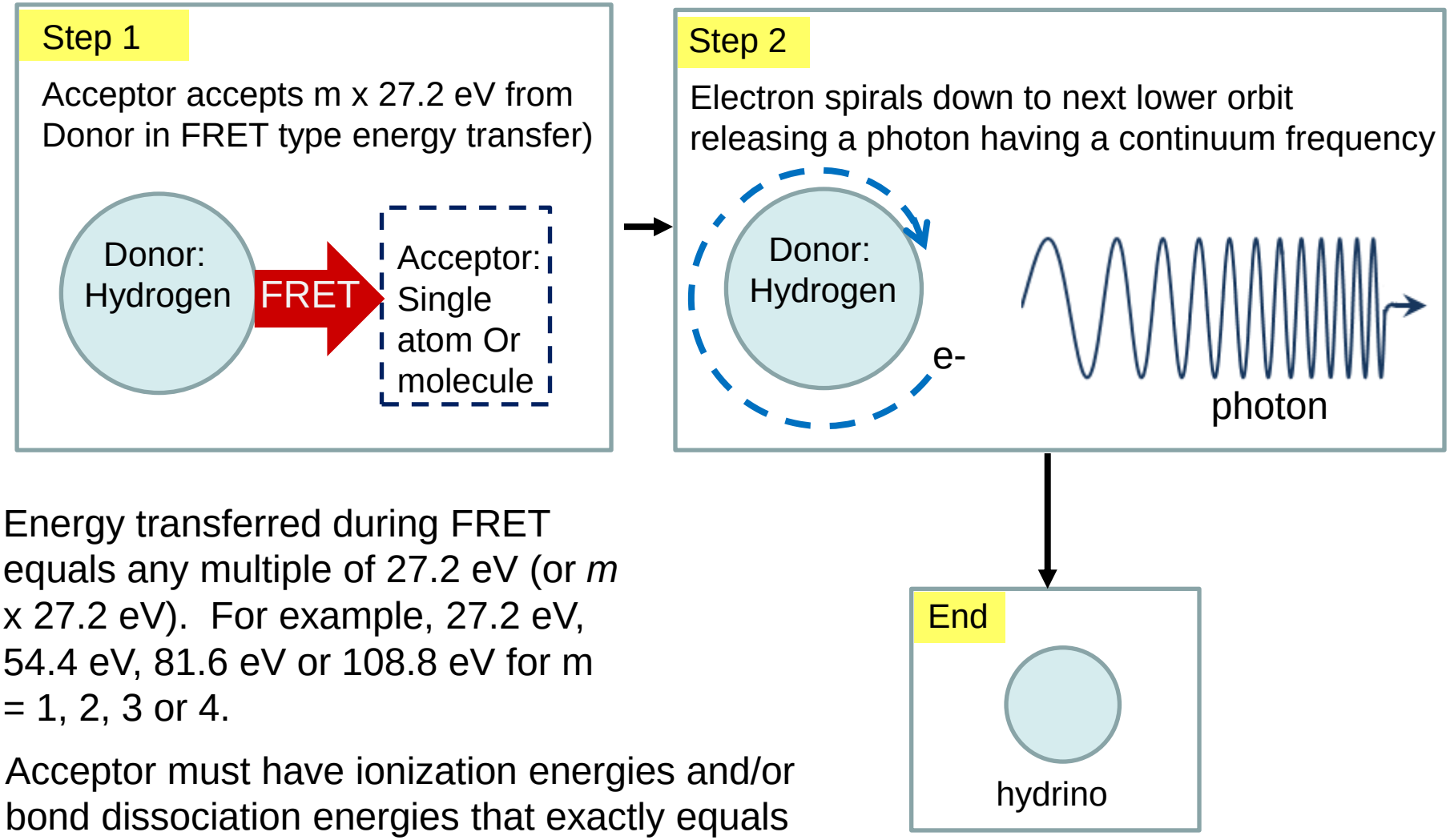
Step 2

Electron of donor hydrogen spirals down to next stable fractional orbit ($n_f = 1/p$), releasing continuum radiation (where p is less than or equal to 137).

Donor can be either a monatomic hydrogen at orbit state $n_i = 1$ or a hydrino at orbit state $n_i = 1/p$

Acceptor is an atom or molecule including hydrogen, hydrinos, molecules and bound electrons.

Monatomic hydrogen is converted into a hydrino after FRET type energy transfer to atom or molecule followed by a photon release having a continuum frequency.



Energy transferred during FRET equals any multiple of 27.2 eV (or *m* x 27.2 eV). For example, 27.2 eV, 54.4 eV, 81.6 eV or 108.8 eV for m = 1, 2, 3 or 4.

Acceptor must have ionization energies and/or bond dissociation energies that exactly equals some multiple of 27.2 eV.

Forster Resonance Energy Transfer (FRET) in Blacklight Power's technology

- Monatomic hydrogen, the donor, transfers some integer multiple of 27.2 eV to acceptor (ie. 27.2, 54.4, 81.6, 108.8 eV etc).
- Energy comes from energy "holes" of 27.2 eV in hydrogen.
- Acceptor is a molecule or atom that has bond dissociation or electron ionization energy that exactly sums to an integer multiple of 27.2 eV.

Forster Resonance Energy Transfer

- Radiationless, coulombic dipole/dipole energy transfer.
- Amount of energy transfer varies inversely with distance to 6th power such that it only occurs over very short distances, typically 2-10 nm.

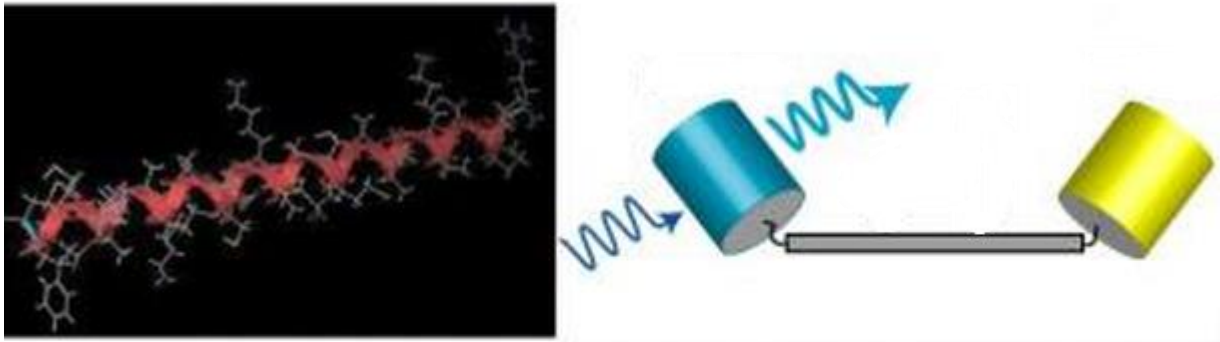
Examples of FRET

- FRET transfer process occurs in phosphors that contain manganese and antimony ions resulting in a strong luminescence from the manganese. Older generations of mercury fluorescent light bulbs used this process.
- Molecular tags that luminesce in a FRET process are used in determining biological and chemical processes. Strength of the luminescence indicates distance between the molecular tags.

Step 1 details

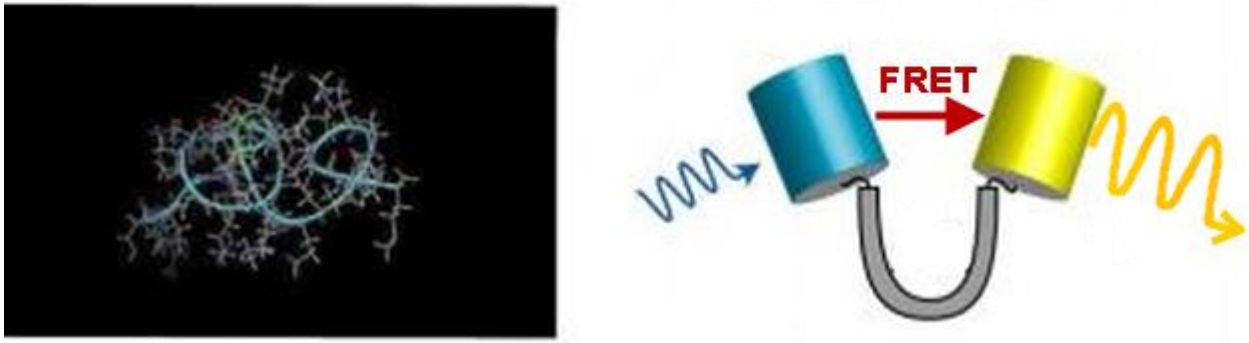
Example of FRET in biology (no hydrinos involved)

Protein unfolded, distance too large = No FRET transfer.



FRET = Forster Resonance Energy Transfer
Energy transfer by coulombic dipole / dipole coupling.

Protein folded and distance small = FRET transfer.



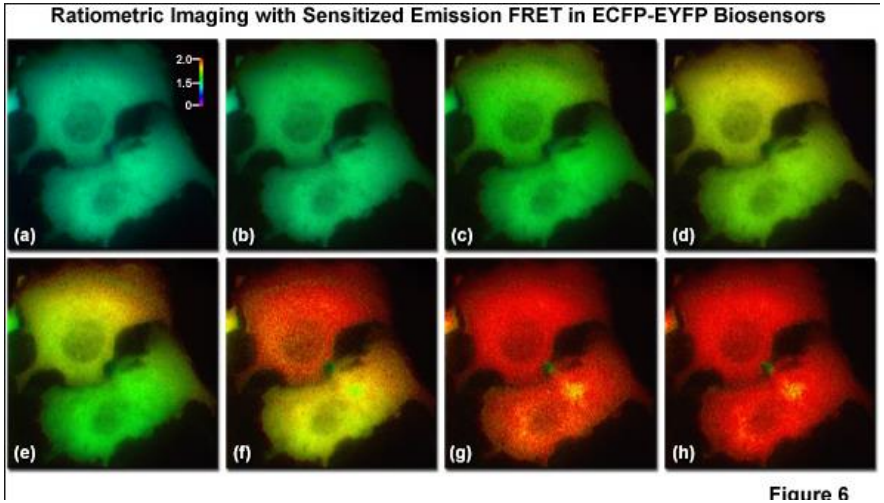
$$E = \frac{1}{1 + (r/R_0)^6}$$

efficiency

FRET energy transfer between two light emitting and absorbing molecular tags that were added to a folding protein. Yellowish photon released only when the protein folds and the “tags” are close together. The efficiency of the FRET transfer varies inversely with distance to the 6th power such that it occurs only over very small distances (2-10 nm). Method is used in biology to indicate distance between two locations on a molecule.

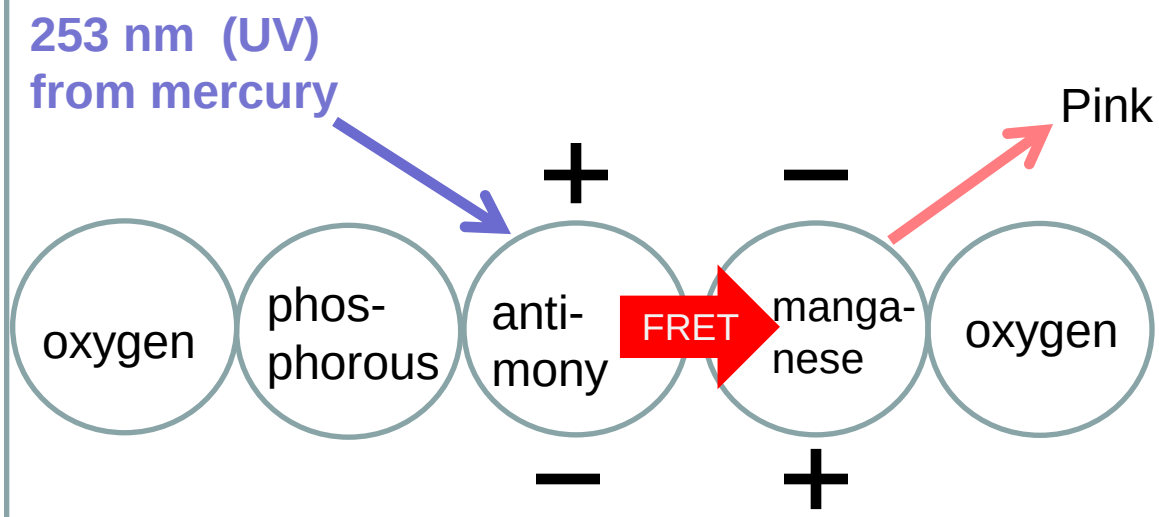
Examples of FRET (unrelated to hydrinos)

FRET in biology



View through microscope of light color changes due to FRET processes

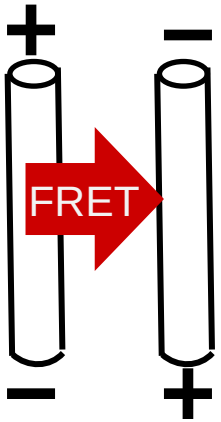
FRET in mercury light bulbs



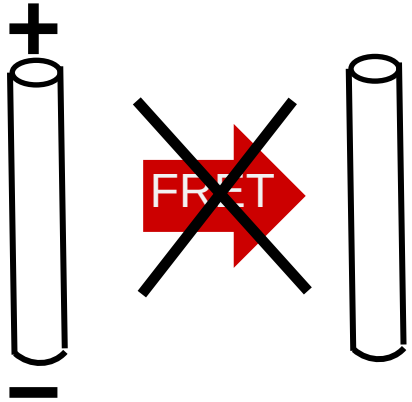
previous generation of mercury light bulbs had a FRET process involved.

Step 1 details

Forster Resonance Energy Transfer is a radiationless, coulombic dipole/dipole energy transfer.



Close together
FRET energy transferred from Donor to Acceptor.



NOT close together
No FRET energy transferred.

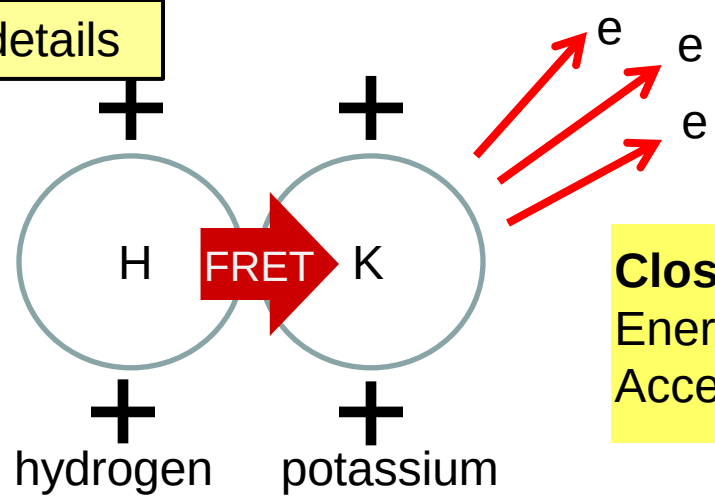
Efficiency of transfer varies inversely with distance to the 6th power. Thus occurs only over short distances (i.e. contact).

$$E = \frac{1}{1 + (r/R_0)^6}$$

efficiency

6th power

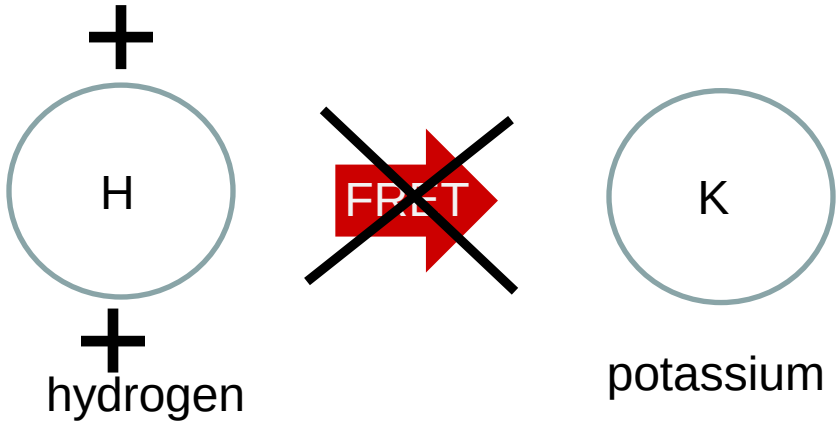
Step 1 details



In this case, 3 electrons are ionized to infinity

Close together (virtually touching): Energy transferred from Donor to Acceptor in multiples of 27.2 eV

Forster Resonance Energy Transfer is a radiationless, coulombic dipole/dipole energy transfer.
For monatomic hydrogen, it only happens in some multiple of 27.2 eV (i.e. 27.2, 54.4, 81.6, 108.8 eV etc). Typically energy causes ionization of electrons in acceptor.



Not Close together (a few hydrogen diameters apart): No energy transferred.

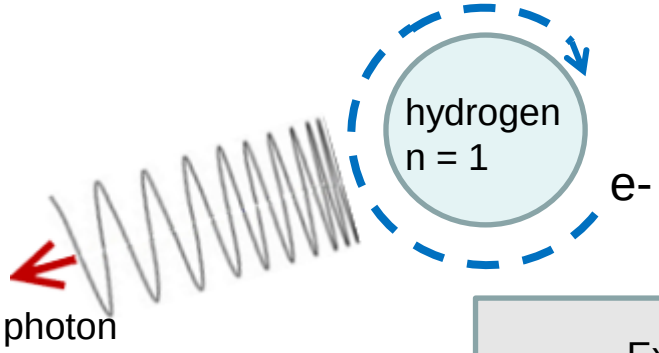
start animation

Efficiency of transfer varies inversely with distance to the 6th power which means it only happens over short distances (i.e. contact).

Step 2 details

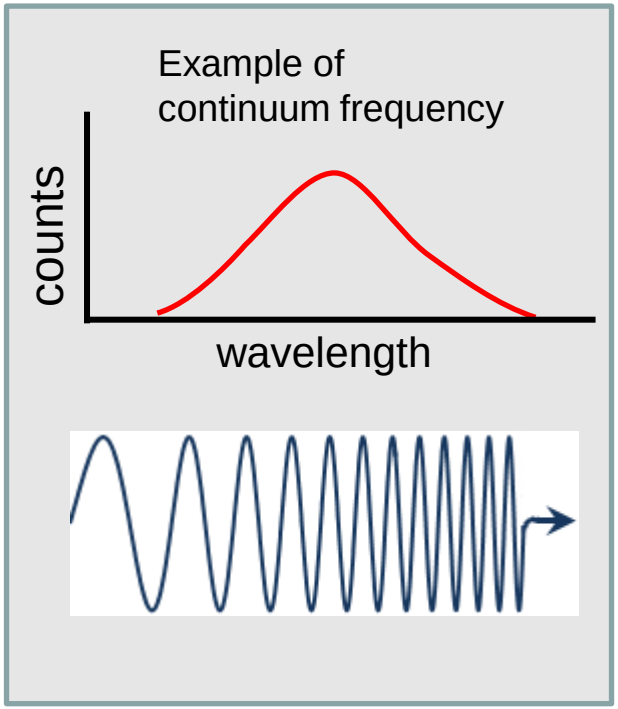
Photon with continuum frequency

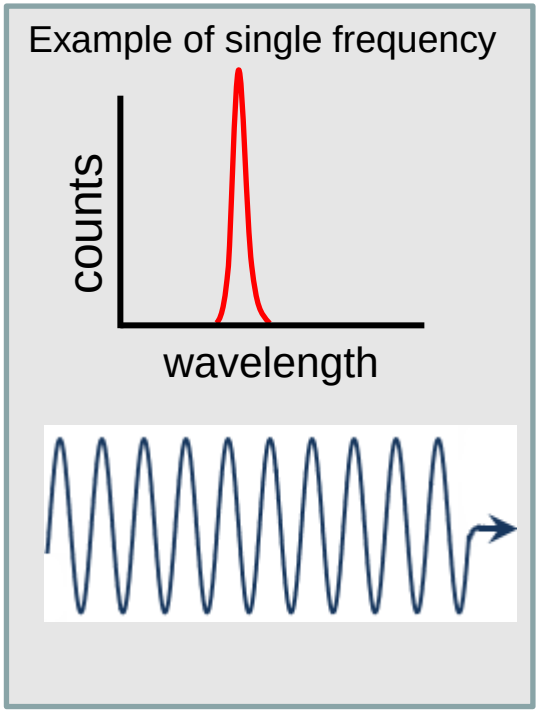
After the FRET type energy transfer from the donor to the acceptor (m x 27.2 eV where m is an integer), the electron spirals down to the next lower stable orbit state while releasing a photon having a continuum frequency.



For example, after FRET transfer of 81.6 eV to an acceptor, electron spirals down to orbit state n = 1/4 releasing a 122.4 eV photon having a continuum frequency with a cutoff wavelength at 10.1 nm that extends to longer wavelengths.

Photon having continuum frequency

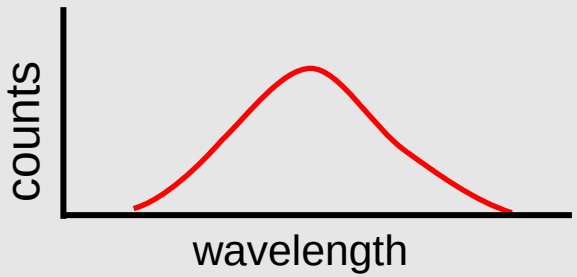


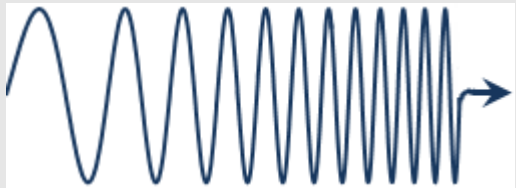


Step 2 details

Photon with continuum frequency

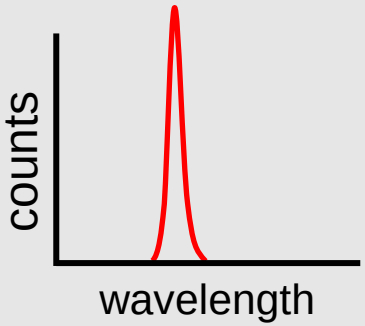
Example of continuum frequency

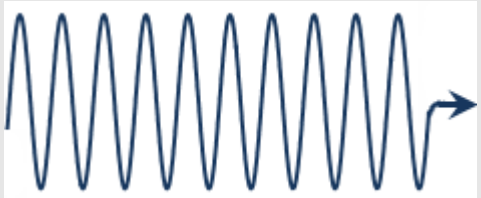




Photons having a continuum frequency spectrum would show up on a detector as having central peak with a wide distribution of wavelengths to either side.

Example of single frequency





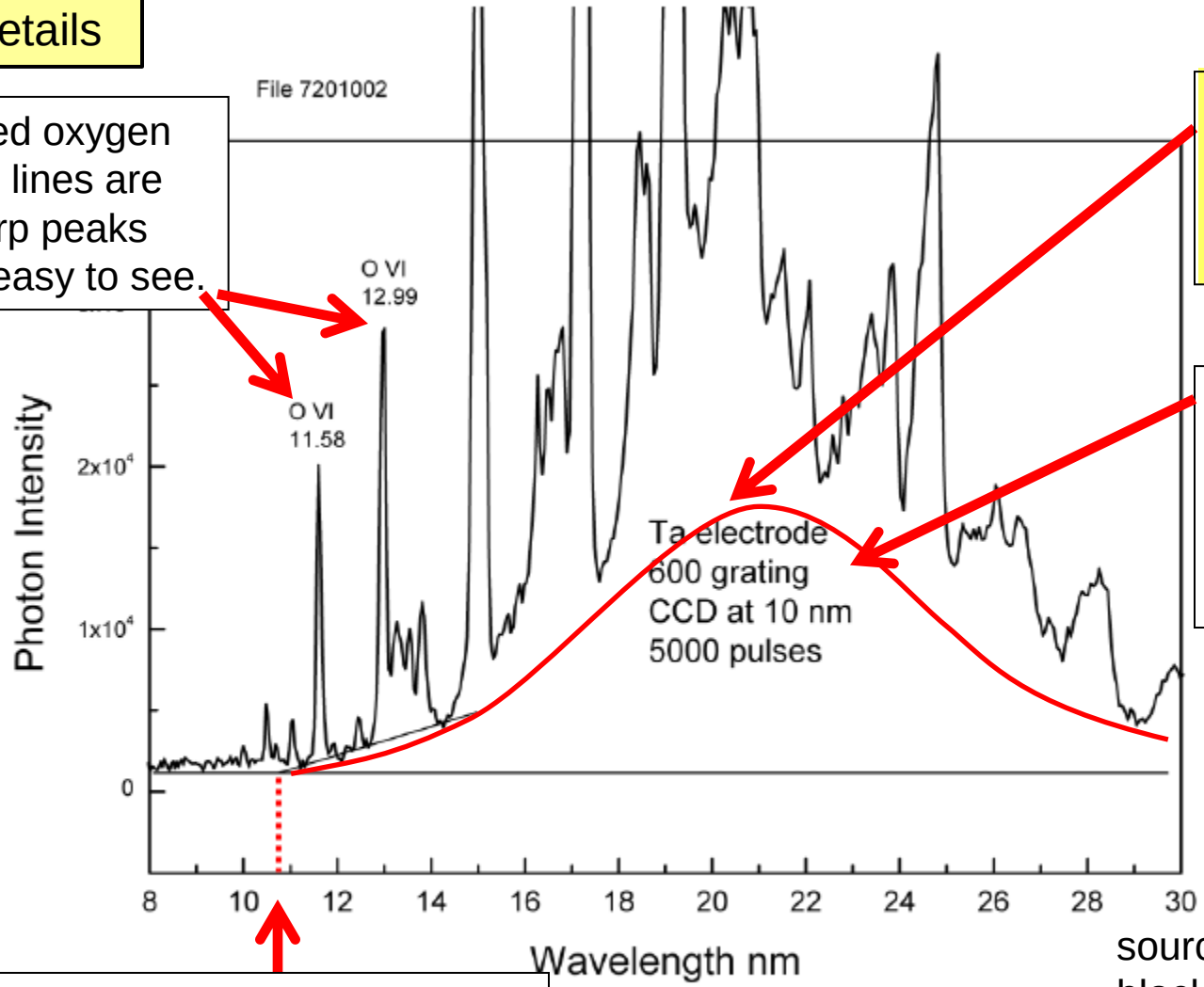
Photons having the same single frequency would show up on a detector as having central peak with a very small distribution of wavelengths to either side. The distribution would be theoretically zero for a perfect detector and one specific frequency.

Step 2 details

Stimulated oxygen emission lines are very sharp peaks that are easy to see.

Not easy to determine exact peak for continuum radiation

Example of possible shape of continuum radiation curve that created actual data.

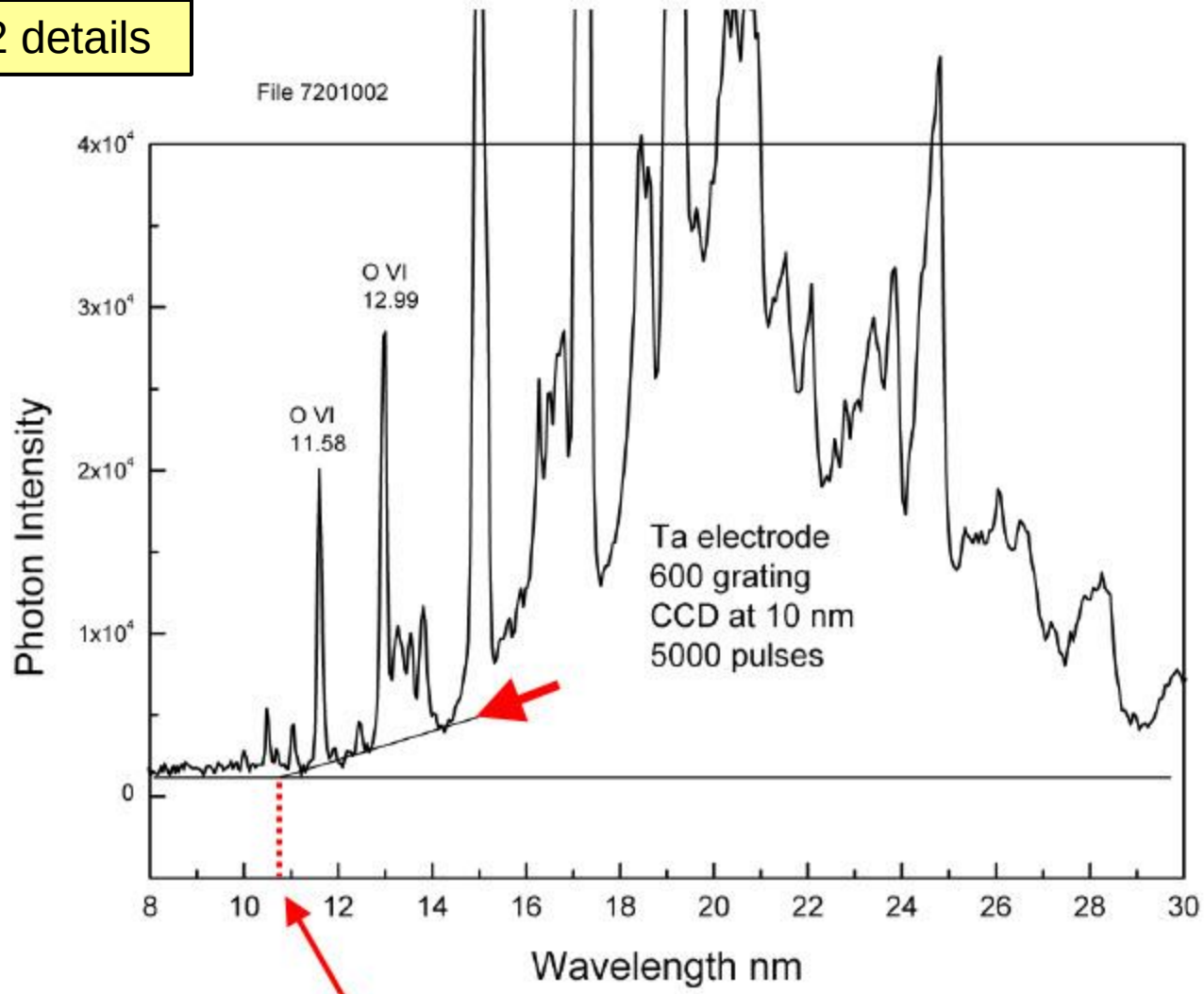


source: blacklightpower.com

Continuum radiation has cutoff near 10.1 nm that extends to longer wavelengths.

In Mills's theory, 122.4 eV of continuum radiation is emitted from hydrogen when electron spirals down to next lower stable orbit. Radiation has a cutoff wavelength at 10.1 nm that extends to longer wavelengths. Continuum radiation is broad and does not have a well defined peak. Compare this to the oxygen emission lines which are very sharp and well defined.

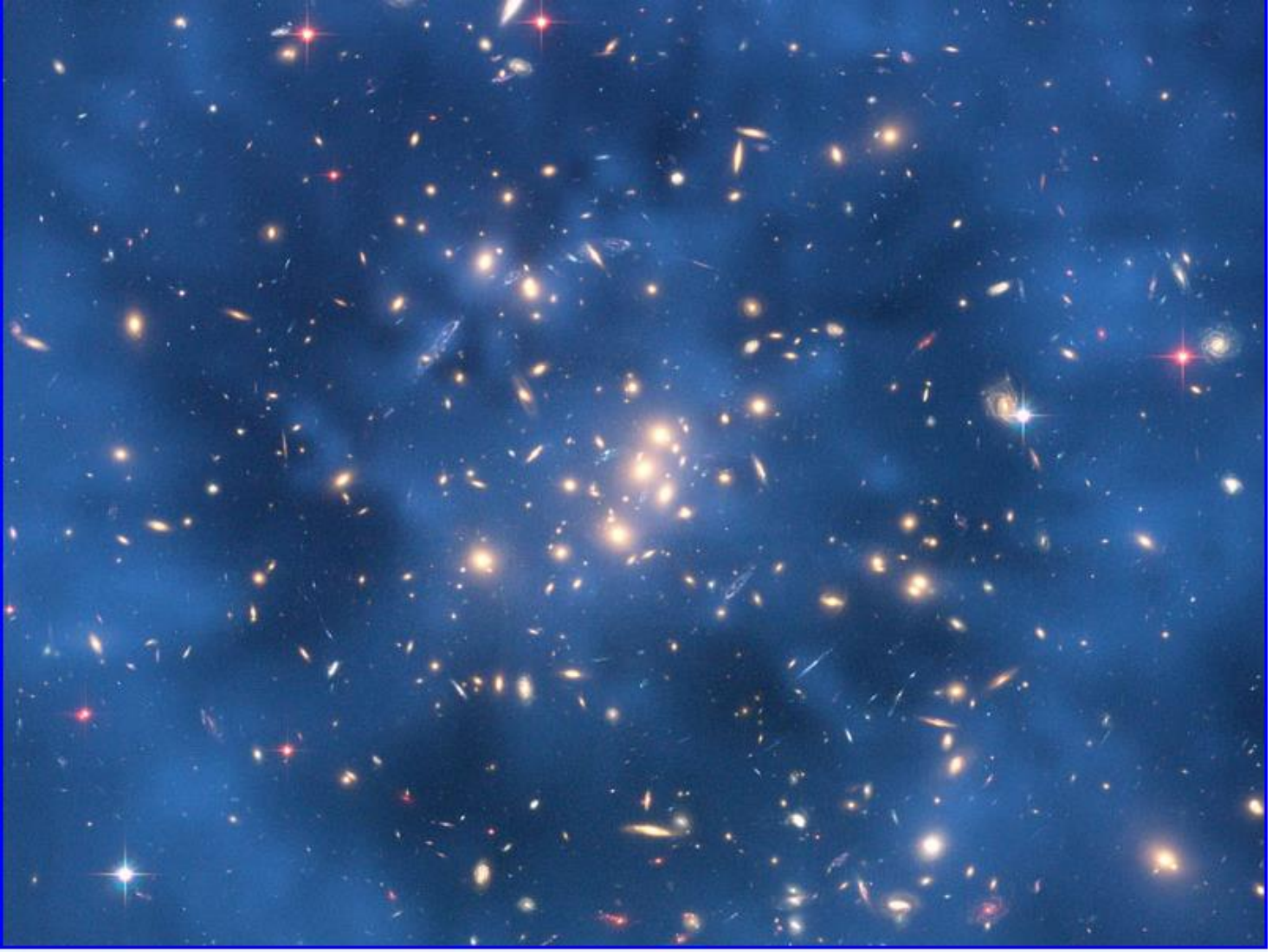
Step 2 details



source:
blacklightpower.com

continuum radiation has cutoff at approximately 10.8 nm which is close to Mills theory which predicts 10.1 nm.

Low energy plasma arcs give continuum radiation with cutoffs that match Mills's theory.

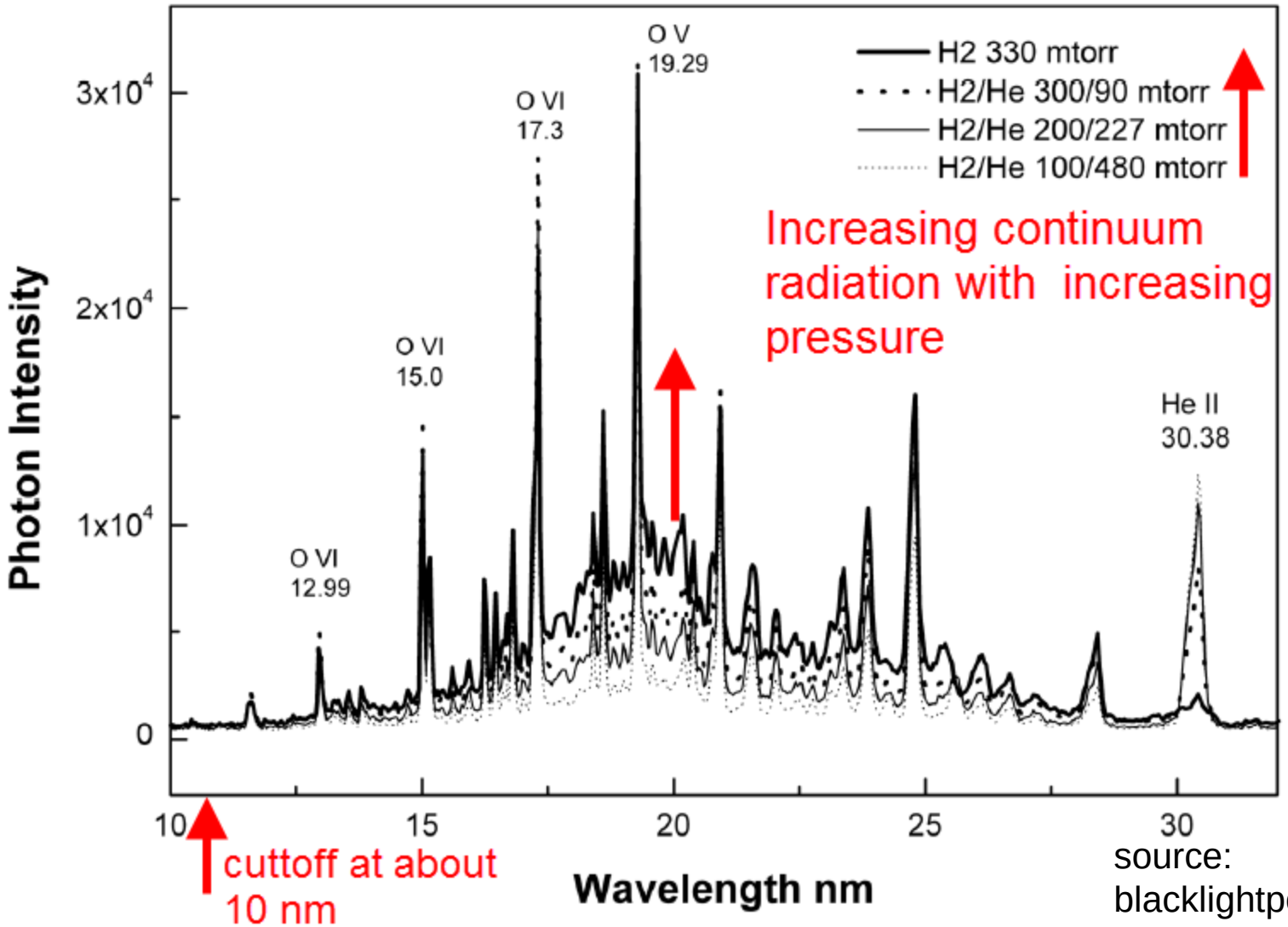


Dark Matter Ring Modeled around Galaxy Cluster CL0024+17

Bluish tint is a computer generated overlay of dark matter locations. The darker areas are an absence of dark matter. Look for the long thin streaks stretched along radial arcs that indicate a common center point at the center of the photo. These are galaxies optically stretched through gravitational lensing.

Evidence of dark matter.
Light does not interact with dark matter. Light will not reflect off dark matter and dark matter will not absorb light. But dark matter has mass and will gravitationally bend light.

Step 2 details



source: blacklightpower.com

Low energy plasma arcs give increasing continuum radiation as the Hydrogen pressure increases, with cutoffs that match Mills's theory .

In Mills's model, the formula for total energy emitted by hydrogen between initial orbit state n_i and final orbit state n_f is

Total Energy Released:

$$\Delta E = 13.598\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right) \text{ eV}$$

final orbit state

initial orbit state

$$\text{where } n = \begin{cases} \frac{1}{2}, \frac{1}{3}, \frac{1}{4} \ldots \frac{1}{p} & \text{and } p \leq 137 \\ 1, 2, 3 \ldots \text{infinity} \end{cases}$$

For final orbit states **n** greater than or equal to 1: All energy is released is in the form of a photon.

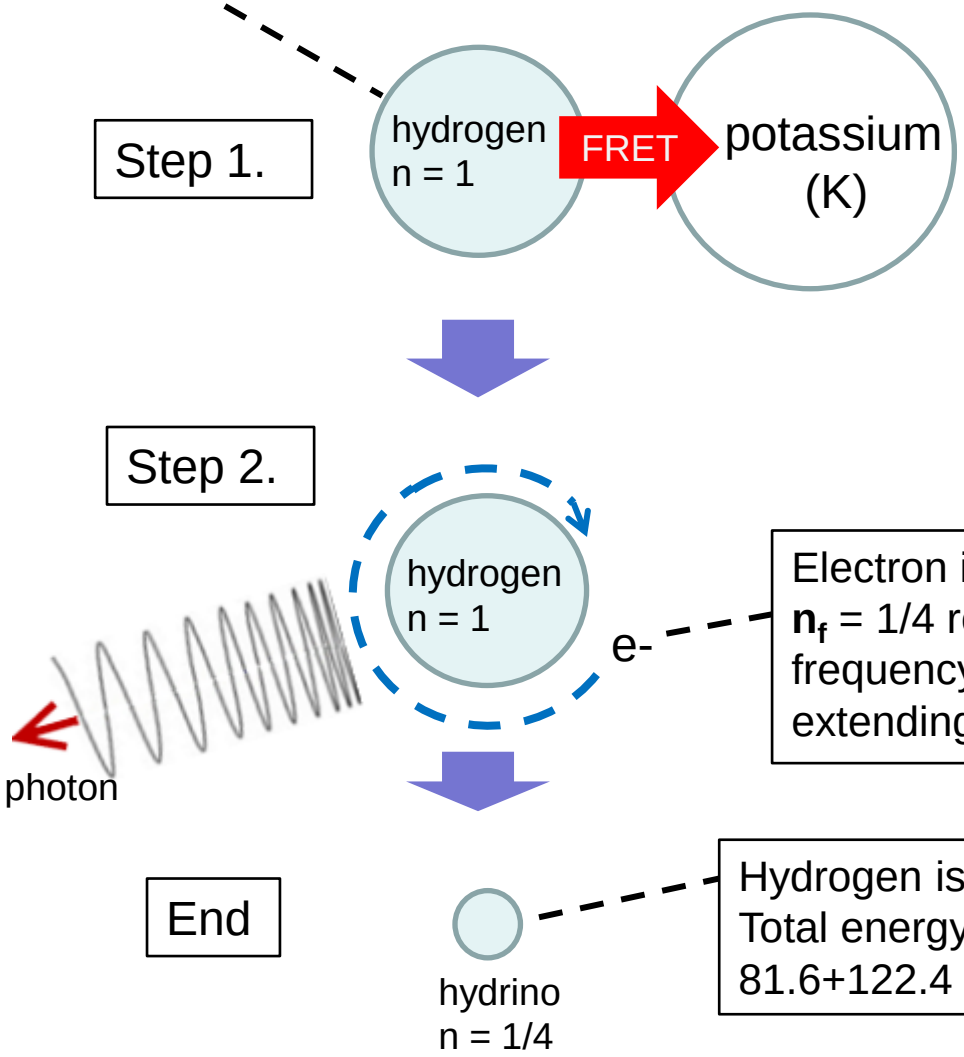
For final orbit states **n** that are fractional numbers (i.e. hydrinos): Energy released can include the following: kinetic energy (thermal energy), bond dissociation energy, electron ionization energy and photon energy.

In some experiments by BLP, the kinetic energy is in the form of "fast H" which are fast moving protons (see Balmer line widening in BLP's experiment details).

Note: The Bohr Model uses the same equation above except the Bohr model does not allow for fractional orbit states (i.e. n = 1/2, 1/3 etc are not allowed)

Hydrino (n=1/4) creation from hydrogen (n=1) and potassium

Donor: Monatomic hydrogen at orbit state $\mathbf{n_i}$ = 1 transfers 81.6 eV to potassium in a radiationless, resonant energy transfer FRET type process (m = 3; m x 27.2 eV= 81.6).



Acceptor:
1st, 2nd and 3rd electron ionization energies for potassium are 4.34, 31.63 and 45.81 eV which sum to 81.77 eV.

Electron in donor hydrogen spirals down to orbit state $\mathbf{n_f}$ = 1/4 releasing a 122.4 eV photon having a continuum frequency with a cutoff wavelength of 10.1 nm and extending to longer wavelengths.

Hydrogen is now a hydrino at orbit state n = 1/4. Total energy released equals 204 eV (because 81.6+122.4 = 204 eV).

Hydrino (n=1/4) creation from monatomic hydrogen (n=1) and potassium

Donor	
atom or molecule	monatomic hydrogen
initial orbit state $\mathbf{n_i}$	1
final orbit state $\mathbf{n_f}$	1/4
m	3

Acceptor	
atom or molecule	Potassium
number of electrons ionized	3
1st ionization (eV)	4.341
2nd ionization (eV)	31.63
3rd ionization (eV)	45.81
Sum	81.78 eV

Energy		
Total Energy Released (eV)	204	Eq. 1
FRET energy (m x 27.2 eV)	81.6	Eq. 2
Photon (eV)	122.4	Eq. 3
Cuttoff Wavelength (nm)	10.1	Eq. 4

Total Energy Released:

$$\Delta E = 13.598\ \text{eV}\left(\frac{1}{n_f^2} - \frac{1}{n_i^2}\right) = 13.598\ \text{eV}\left(\frac{1}{(1/4)^2} - \frac{1}{(1)^2}\right) = 204.0\ \text{eV} \qquad \text{(Eq. 1)}$$

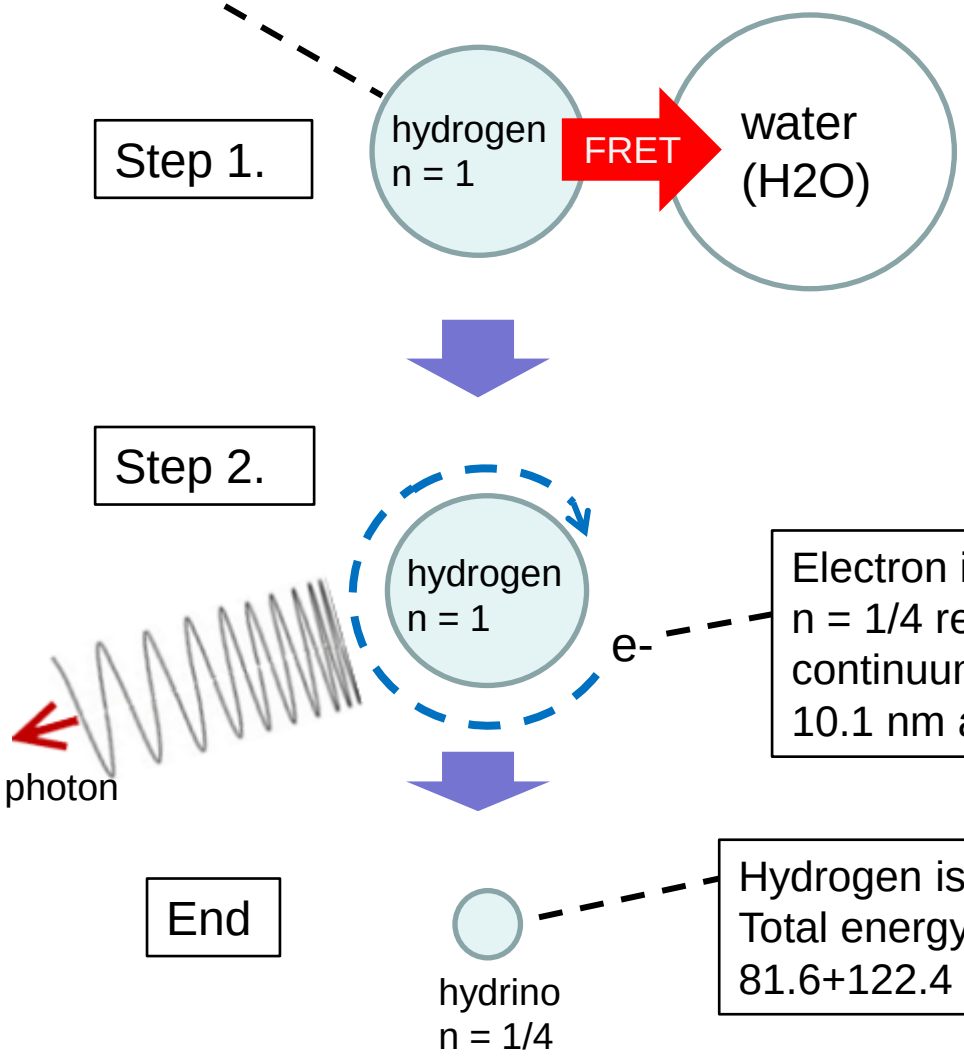
FRET energy = m x 27.2 = 3 x 27.2 eV = 81.6 eV (Eq. 2)

Photon energy = ΔE - (FRET energy) = 204.0 - 81.6 = 122.4 eV (Eq. 3)

$$\text{Cutoff Wavelength} = \frac{hc}{E} = \frac{1239.841(\text{nanometers}\cdot\text{eV})}{122.4\ \text{eV}} = 10.12\ \text{nm} \qquad \text{(Eq. 4)}$$

Hydrino (n=1/4) creation from hydrogen (n=1) and water molecule

Donor: Monatomic hydrogen at orbit state $\mathbf{n_i}$ = 1 transfers 81.6 eV (3 x 27.2 eV) to an isolated water molecule in a radiationless, resonant energy transfer process.



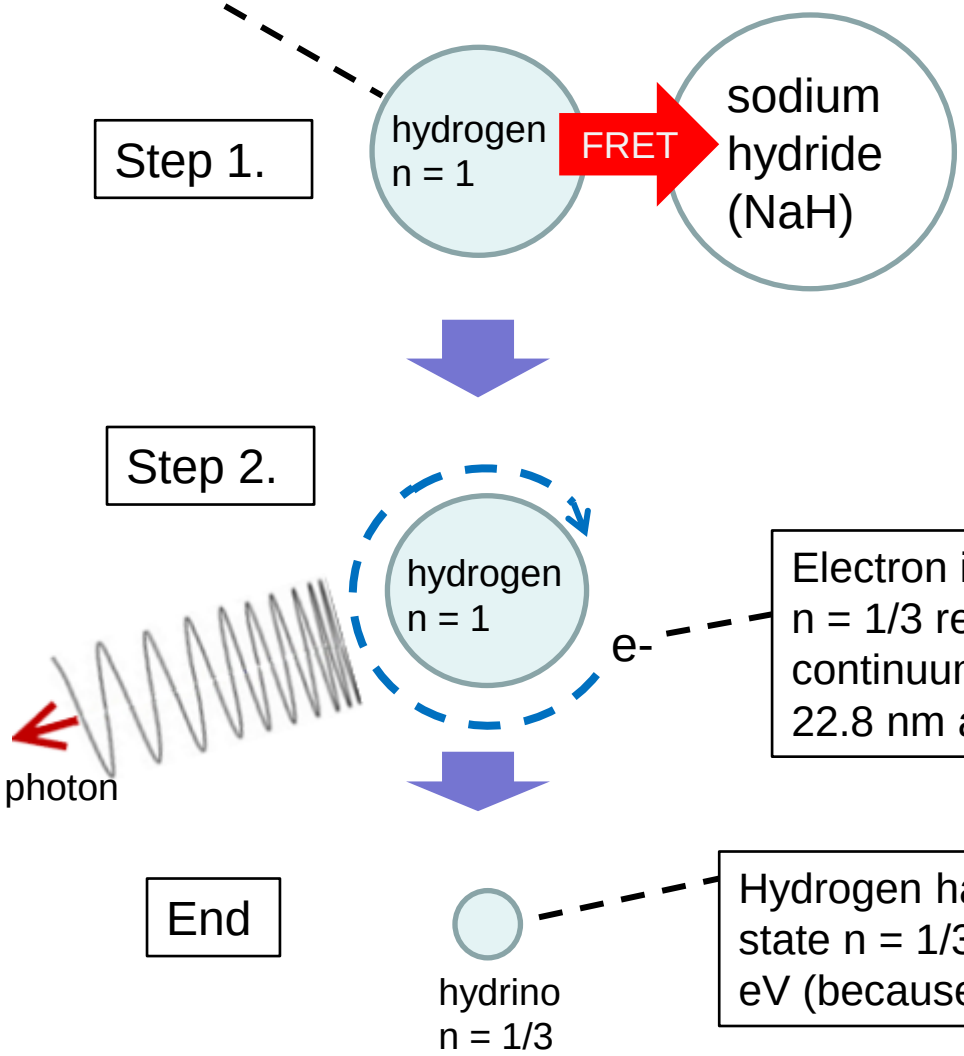
Acceptor: Isolated water molecule requires 81.6 eV to break the bonds into the following : two monatomic hydrogens, one monatomic oxygen and three ionized electrons.

Electron in donor hydrogen spirals down to orbit state n = 1/4 releasing a 122.4 eV photon having a continuum frequency with a minimum wavelength of 10.1 nm and extending to longer wavelengths.

Hydrogen is now a hydrino at orbit state n = 1/4. Total energy released equals 204 eV (because 81.6+122.4 = 204).

Hydrino (n = 1/3) creation from hydrogen and Sodium (initially bonded as Sodium Hydride, NaH)

Donor: Monatomic hydrogen at orbit state n = 1 transfers 54.35 eV (2 x 27.2 eV) to sodium hydride (NaH) in a radiationless, resonant energy transfer process.



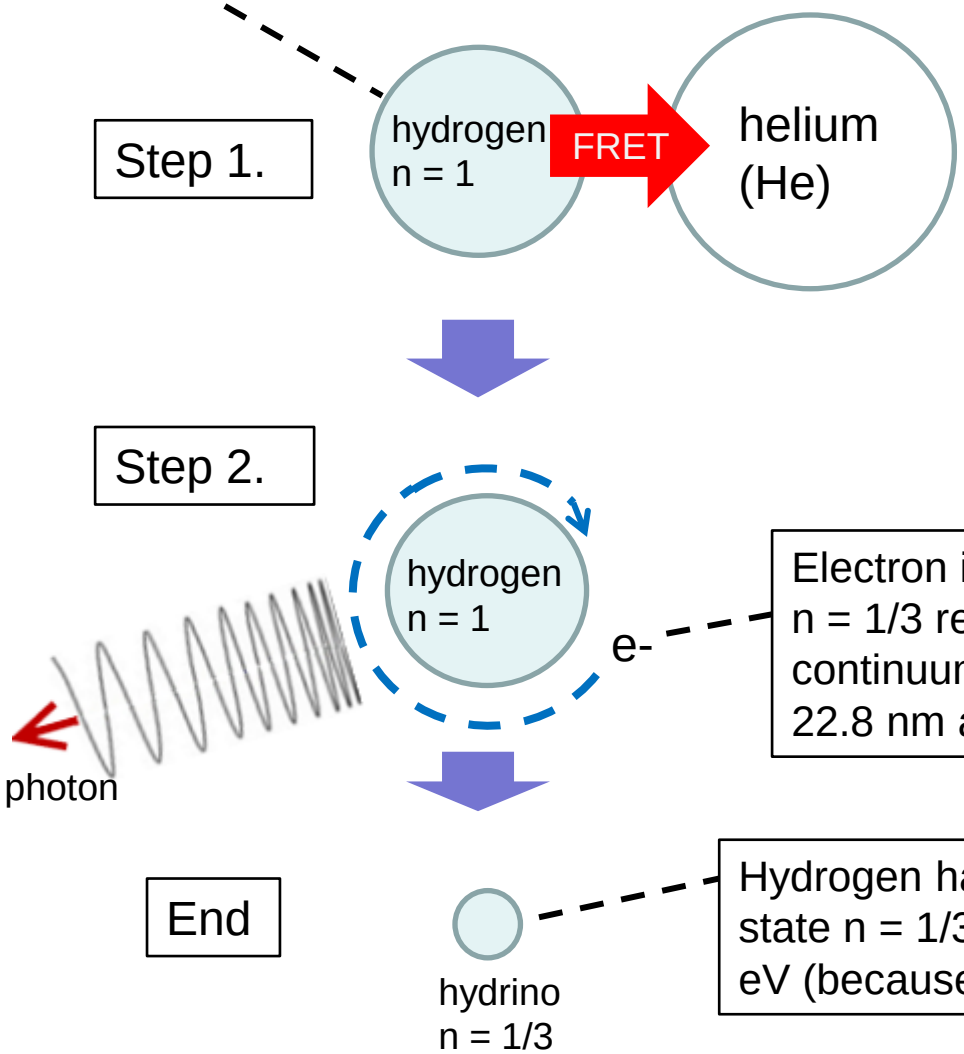
Acceptor:
Sodium hydride requires a total of 54.35 eV to do the following:
1.92 eV to break the bond between sodium and hydrogen and 5.14 eV and 47.29 eV for 1st and 2nd electron ionization.
Total = 1.92 + 5.14 + 47.29 = 54.35 eV.

Electron in donor hydrogen spirals down to orbit state n = 1/3 releasing a 54.4 eV photon having a continuum frequency with a minimum wavelength of 22.8 nm and extending to longer wavelengths.

Hydrogen has converted into a hydrino at orbit state n = 1/3. Total energy released equals 108.8 eV (because 54.4 eV + 54.4 eV = 108.8 eV).

Hydrino (n =1/3) creation from hydrogen and helium

Donor: Monatomic hydrogen at orbit state n = 1 transfers 54.35 eV (2 x 27.2 eV) to helium in a radiationless, resonant energy transfer process.



Acceptor:
2nd electron ionization energy for helium is 54.42 eV.

Electron in donor hydrogen spirals down to orbit state n = 1/3 releasing a 54.4 eV photon having a continuum frequency with a minimum wavelength of 22.8 nm and extending to longer wavelengths.

Hydrogen has converted into a hydrino at orbit state n = 1/3. Total energy released equals 108.8 eV (because 54.4 eV + 54.4 eV = 108.8 eV).

Photon, Thermal and Total Energy Released for the Hydrogen Atom.
Measured and Calculated Values.
Randell Mills model of the atom.

Electron Orbit Transition $n = \begin{cases} 1,2,3 \ldots \text{inf.} \\ \frac{1}{2}, \frac{1}{3}, \frac{1}{4} \ldots \frac{1}{137} \end{cases}$	Wavelength Calculated From Mills's model (nanometers)	Wavelength Measurement Using Spectroscopy (nanometers)	Photon Energy (eV)	Thermal Energy (eV)	Total Energy Released (eV)	Series Name
$1 \rightarrow \frac{1}{4}$	cuttoff at 10.1 nm*		122.4	81.6	204	Not Yet Named
$1 \rightarrow \frac{1}{3}$	cuttoff at 22.8 nm*		54.4	54.4	108.8	
$1 \rightarrow \frac{1}{2}$	cuttoff at 91.2 nm*		13.6	27.2	40.8	
2 → 1	121.50	121.5	10.20	0	10.20	Lyman Series
3 → 1	102.52	102.5	12.09	0	12.09	
4 → 1	97.20	97.2	12.76	0	12.76	
5 → 1	94.92	94.9	13.06	0	13.06	
6 → 1	93.73	93.7	13.23	0	13.23	
7 → 1	93.03	93	13.33	0	13.33	
8 → 1	92.57	92.6	13.39	0	13.39	
9 → 1	92.27	92.3	13.44	0	13.44	
10 → 1	92.05	92	13.47	0	13.47	
11 → 1	91.89	91.9	13.49	0	13.49	
infinity → 1	91.13	91.12	13.61	0	13.61	

Hydrinos

*Formation of hydrinos releases thermal energy and electromagnetic radiation energy. The electromagnetic radiation has a continuous frequency spectrum having a cuttoff at the wavelength listed.

Energy released for various orbit transitions.

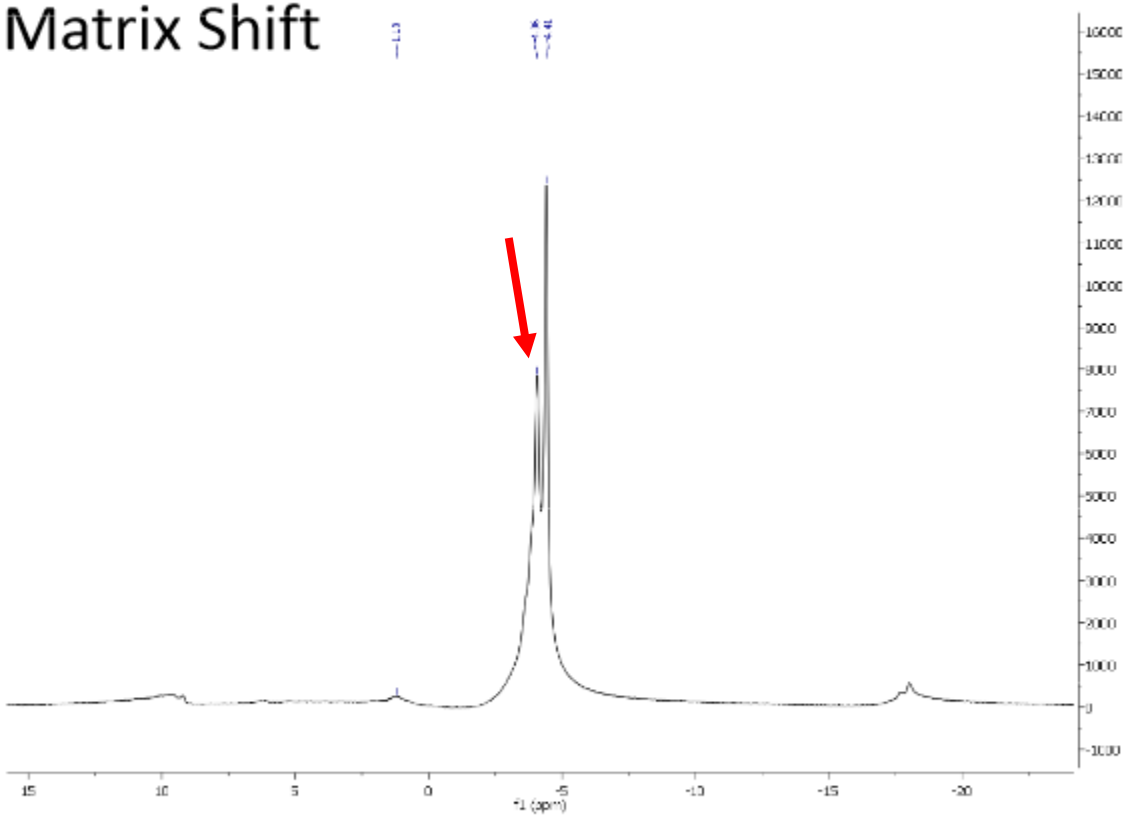
Blacklight Power Data

Hydrinos – direct methods of detection

- Continuum radiation
- FTIR, (Fourier Transform Infrared Spectroscopy)
- Raman Spectroscopy
- Photoluminescence Spectroscopy
- NMR (Nuclear Magnetic Resonance)
- ToF-SIMS (Time of Flight-Secondary Ion Mass Spectrometry)

Magic Angle Spinning Nuclear Magnetic Resonance

^{1}H MAS NMR of H_2(1/4) in Getter Causing Matrix Shift



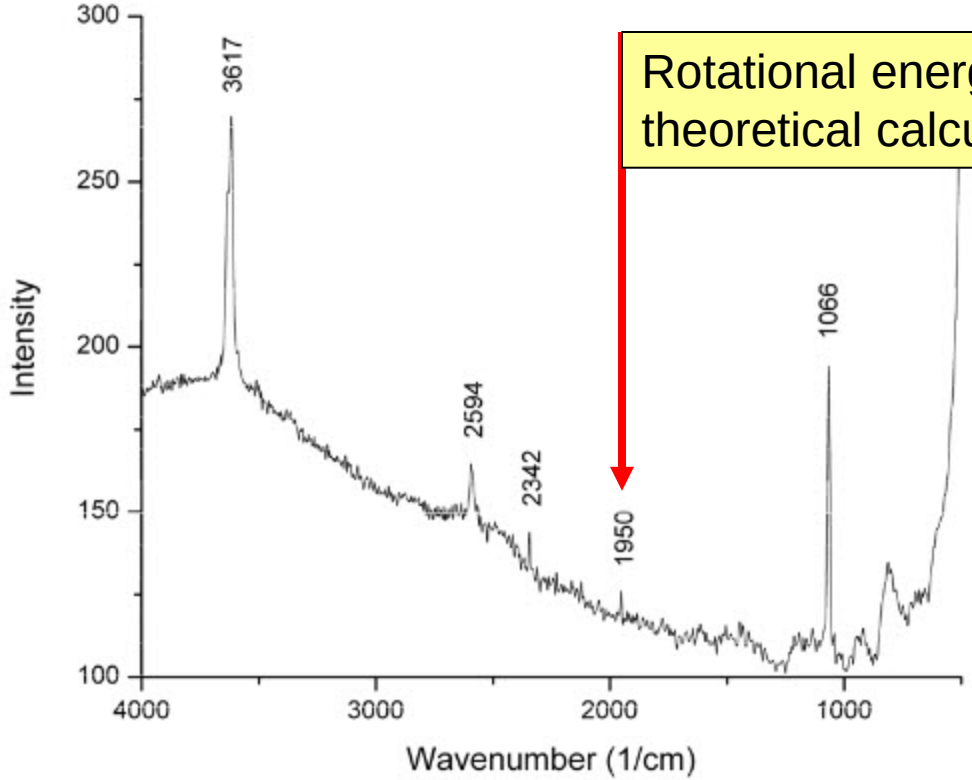
^{1}H MAS NMR spectrum relative to external TMS of the KOH-KCl (1:1) getter from the scale-up 5 W stack of 10 CIHT cells comprising [Mo/LiOH-LiBr-MgO/NiO] that output 1029 Wh at 137% gain that shows upfield shifted matrix peaks at -4.06 and -4.41 ppm. The small symmetrically spaced peaks are spinning side bands.

source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

Raman Spectrum of $H_2(1/4)$

Raman Spectrum of diatomic hydrino gas

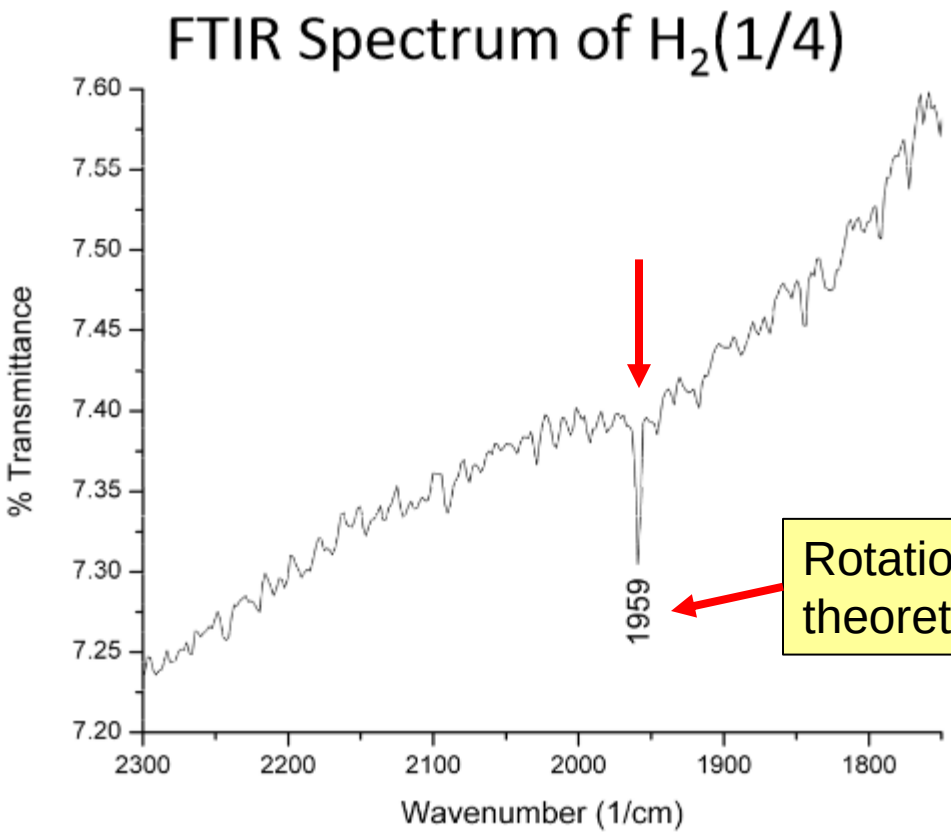
Rotational energy matches theoretical calculation.



The Raman spectrum obtained on the KCl + K getter in the sealed FeOOH + H_2 + Ni screen dissociator solid fuels reactor using the Thermo Scientific DXR SmartRaman spectrometer and the 532 nm laser showing a new sharp peak at 1950 cm^{-1} that matches the free rotor energy of $H_2(1/4)$ (0.2414 eV) to four significant figures. The peak at 2342 cm^{-1} is N_2.

source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

Fourier Transform Infrared Spectroscopy of diatomic hydrino gas



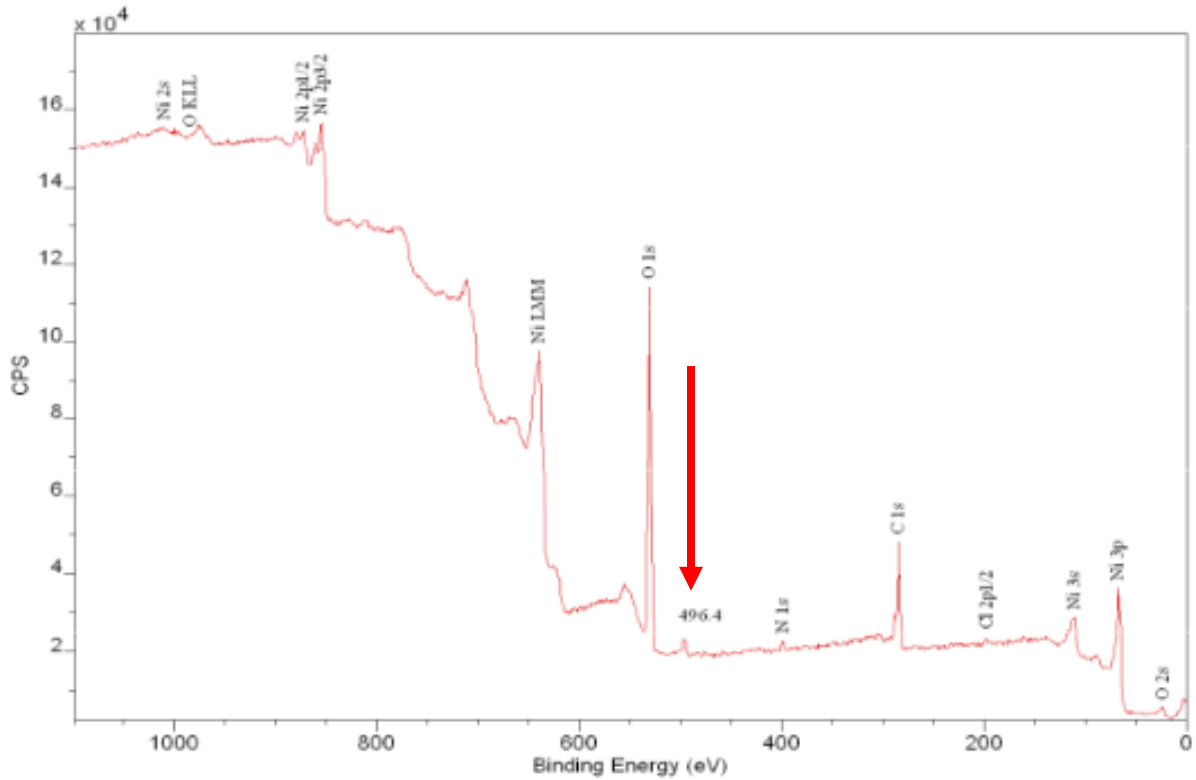
Rotational energy matches theoretical calculation.

The corresponding FTIR spectrum obtained on the KCl + K getter of the FeOOH solid fuel also showing the new sharp peak at 1950 cm^{-1} that matches the free rotor energy of $H_2(1/4)$.

source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

X-ray Photoelectron Spectroscopy of diatomic hydrino gas.

XPS Spectrum of $H_2(1/4)$

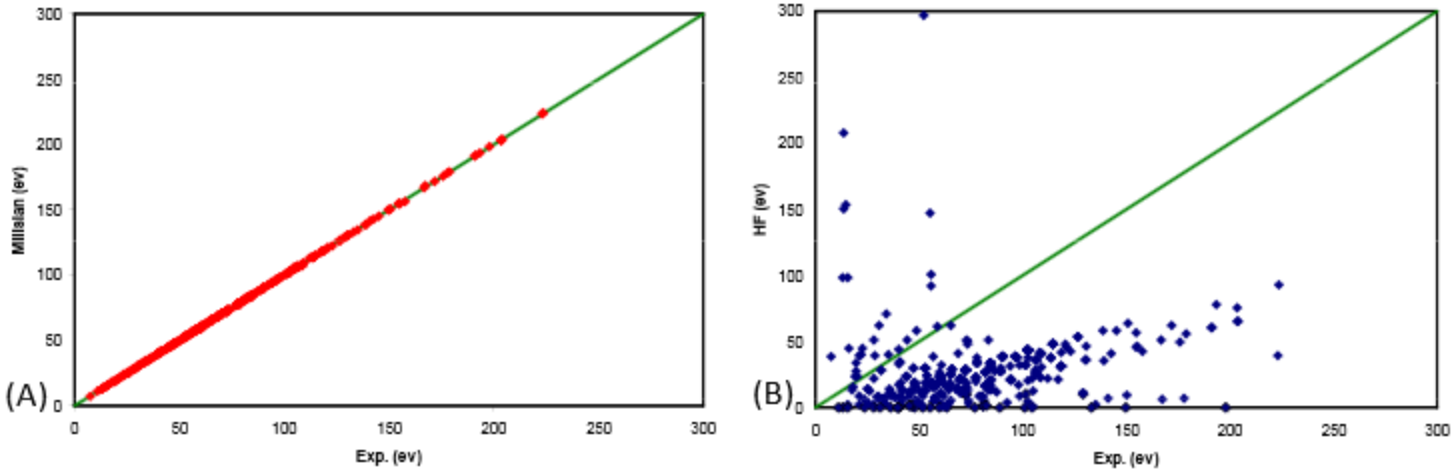


The XPS spectrum of the Ni cathode a K_2CO_3 electrolysis cell having a peak at 496.4 eV assigned to $H_2(1/4)$ wherein the Na KLL Auger peak at 493 eV was eliminated due to the complete absence of the typically more intense Na 1s (1072 eV) as well as the Na $2p_{1/2}$ (31 eV) and Na 2s (64 eV).

source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

Comparison of Classical to Quantum Mechanical Performance

The total bond energies of exact classical solutions of 415 molecules generated by Millsian 1.0 and those from a modern quantum mechanics-based program, Spartan's pre-computed database using 6-31G* basis set at the Hartree-Fock level of theory, were compared to experimental values. (A) The Millsian results were consistently within an average relative deviation of about 0.1% of the experimentally values. (B) In contrast, the 6-31G* results deviated over a wide range of relative error, typically being >30-150% with a large percentage of catastrophic failures, depending on functional group type and basis set.



R. L. Mills, B. Holverstott, W. Good, A. Makwana, J. Paulus, "Total Bond Energies of Exact Classical Solutions of Molecules Generated by Millsian 1.0 Compared to Those Computed Using Modern 3-21G and 6-31G* Basis Sets," Phys. Essays 23, 153 (2010); doi: 10.4006/1.3310832

BLP derives equations that accurately calculate electron ionization energy of different atoms.

source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

Calculated | Measured | Relative Error

Relativistic ionization energies for some one-electron atoms

One e Atom	Z	β (Eq. (1.267) of Ref. [7])	Theoretical Ionization Energies (eV) (Eq. (1.272) of Ref. [7])	Experimental Ionization Energies (eV) [a]	Relative Difference between Experimental and Calculated [b]
H	1	0.00730	13.59847	13.59844	-0.000002
He^{+}	2	0.01459	54.41826	54.41778	-0.000009
Li^{2+}	3	0.02189	122.45637	122.45429	-0.000017
Be^{3+}	4	0.02919	217.72427	217.71865	-0.000026
Be^{4+}	5	0.03649	340.23871	340.2258	-0.000038
C^{5+}	6	0.04378	490.01759	489.99334	-0.000049
N^{6+}	7	0.05108	667.08834	667.046	-0.000063
O^{7+}	8	0.05838	871.47768	871.4101	-0.000078
F^{8+}	9	0.06568	1103.220	1103.1176	-0.000093
Ne^{9+}	10	0.07297	1362.348	1362.1995	-0.000109
Na^{10+}	11	0.08027	1648.910	1648.702	-0.000126
Mg^{11+}	12	0.08757	1962.945	1962.665	-0.000143
Al^{12+}	13	0.09486	2304.512	2304.141	-0.000161

[a] From theoretical calculations, interpolation of H isoelectronic and Rydberg series, and experimental data [35-38].

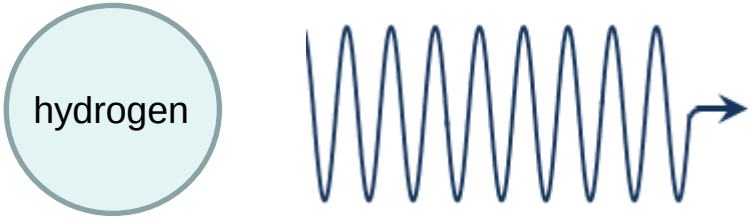
[b] (Experimental-theoretical)/experimental.

This is an error of .016% !

In Randell Mills's GUTCP, electron ionization energies are calculated using Maxwell equations and first principles. SQM can not do this.

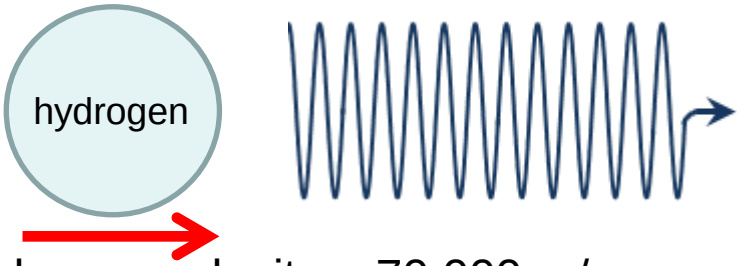
Balmer line widening due to Doppler effect:

Hydrogen atoms that are excited by hyrdrino reactions to the n = 3 orbit state and to a high velocity can emit a 656.2 nm photon when the electron falls to the n = 2 orbit state. The spectroscopy of this emission shows a wider width due to Doppler effects from the fast moving hydrogen.



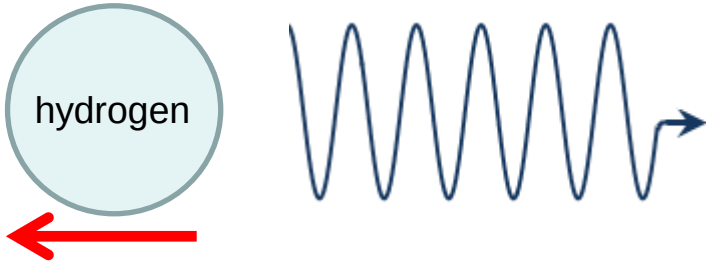
hydrogen velocity near zero (0 m/s)

Detector measures exactly 656.20 nm.



hydrogen velocity = 70,000 m/s

Detector measures slightly smaller wavelength of 656.05 nm.



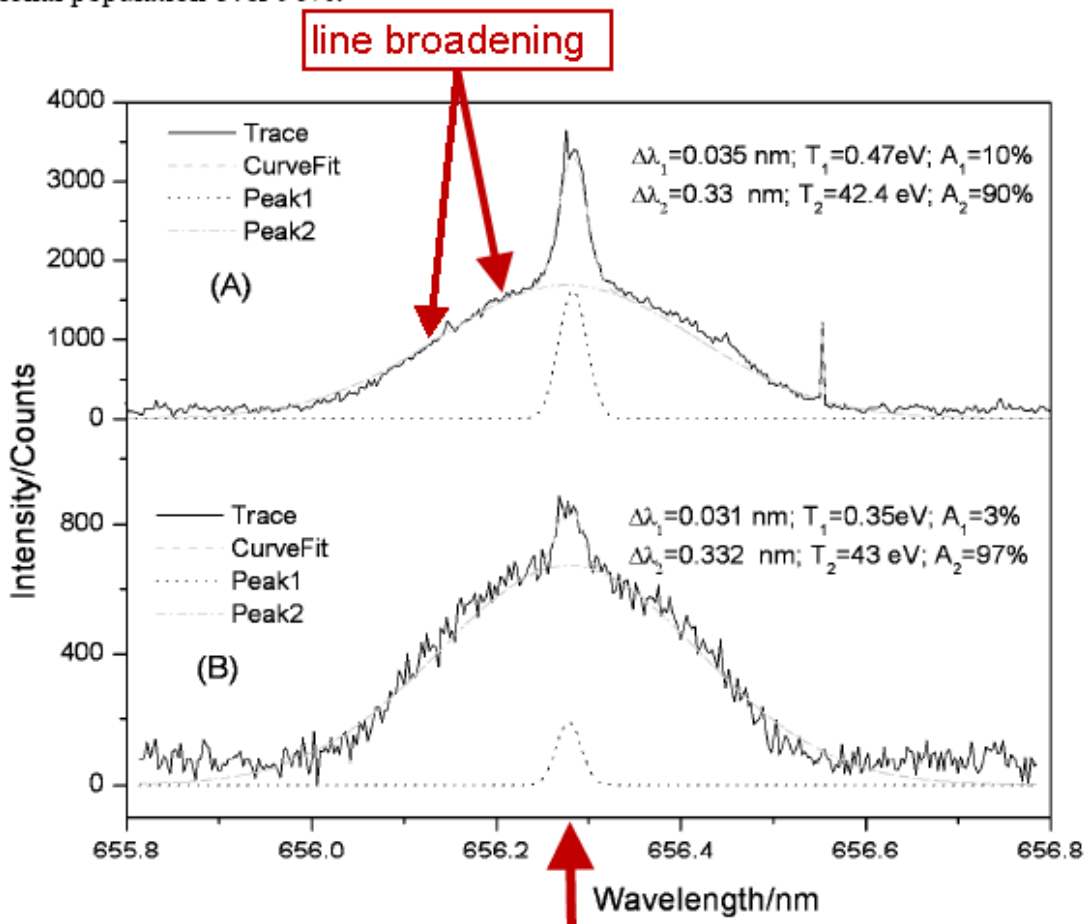
hydrogen velocity = -70,000 m/s

Detector measures slightly longer wavelength of 656.35 nm.

Detector

Balmer line broadnening due to doppler effect. Fast moving Hydrogen ("fast H") emits Balmer photons and due to the doppler effect, the frequency is "smeared" about the center of the frequency. Hydrino reactions produce fast moving hydrogen.

Figure 5. The 656.3 nm Balmer α line width recorded with a high-resolution visible spectrometer on (A) the initial emission of a lithium-argon-hydrogen rt-plasma and (B) the emission at 70 hours of operation. Lithium lines and significant broadening of only the H lines was observed over time corresponding to an average hydrogen atom temperature of >40 eV and fractional population over 90%.



Blacklight Power

CIHT

Catalyst Induced Hydrino Transition

Blacklight Power's CIHT
Catalyst Induced Hydrino Transition

Claims

- 100X (and more) electrical energy output versus input.
- Can be scaled to an output of 3 kw of electricity per liter.
- Low cost materials (molybdenum, nickel, lithium bromide, magnesium oxide)

source:
http://blacklightpower.com

Blacklight Power's CIHT
Catalyst Induced Hydrino Transition

Details

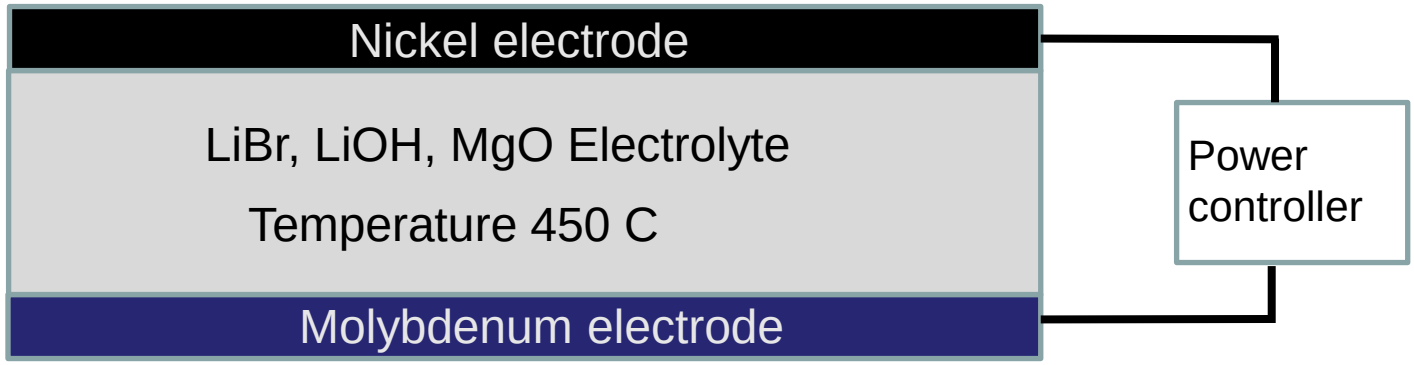
- Best results use molybdenum for anode electrode.
- lithium bromide, lithium hydroxide, magnesium oxide electrolyte (LiBr/LiOH/MgO).
- Needs continuous addition of water vapor for positive results.
- 450 C operating temperature.

Validated by 6 independent individuals or teams:

- California Institute of Technology professor who advises technology companies.
- Industry expert having an MIT PHD degree in chemical engineering who managed R&D for battery and fuel cell development companies.
- Team consisting of an expert R&D manager, a PHD physics/ DOD advisor and a PHD chemist with fuel cell experience.
- Professor with expertise in materials science who collaborates with battery and materials science groups.
- California Institute of Technology professor.
- Defense company with 25 research electrochemists that manufactures missile batteries for defense department.

Input:
water vapor

Output:
hydrinos and electrical energy

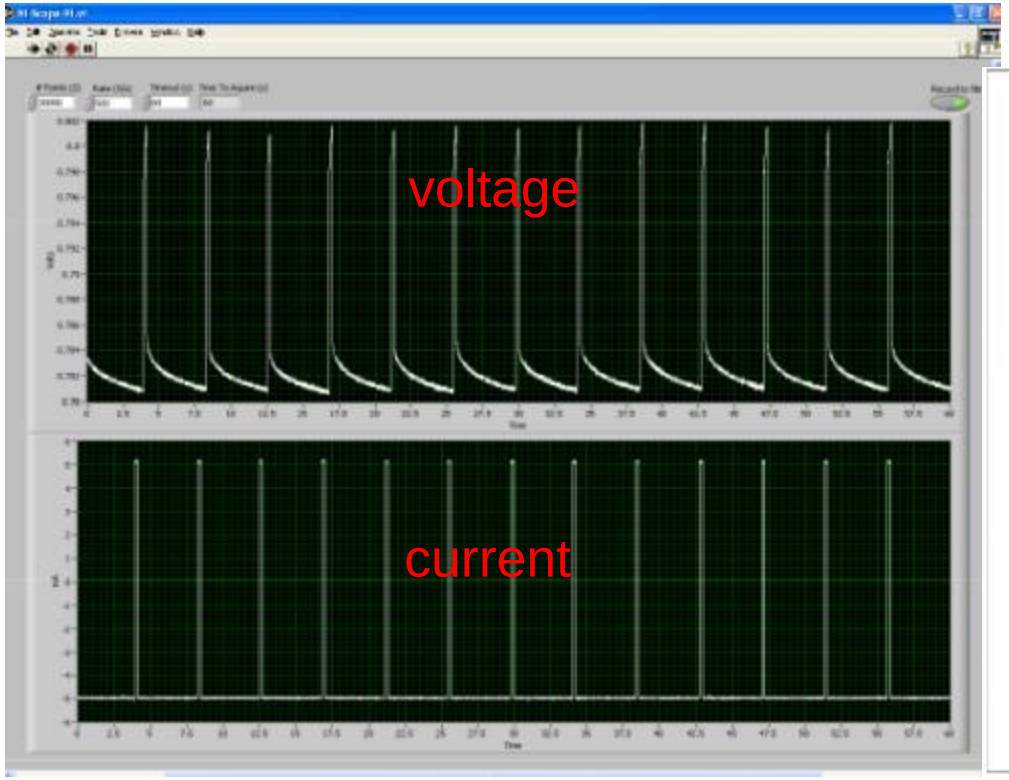


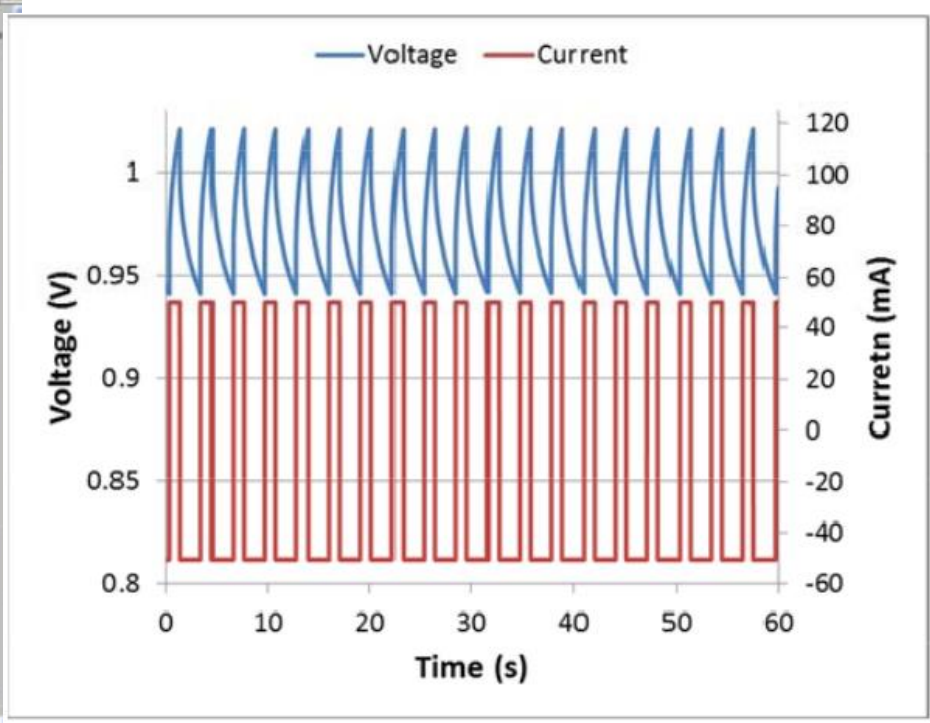
Electrolyte:

- lithium bromide
- lithium hydroxide
- magnesium oxide

Construction is similar to high temperature hydrogen fuel cells currently sold.

Blacklight Power's CIHT



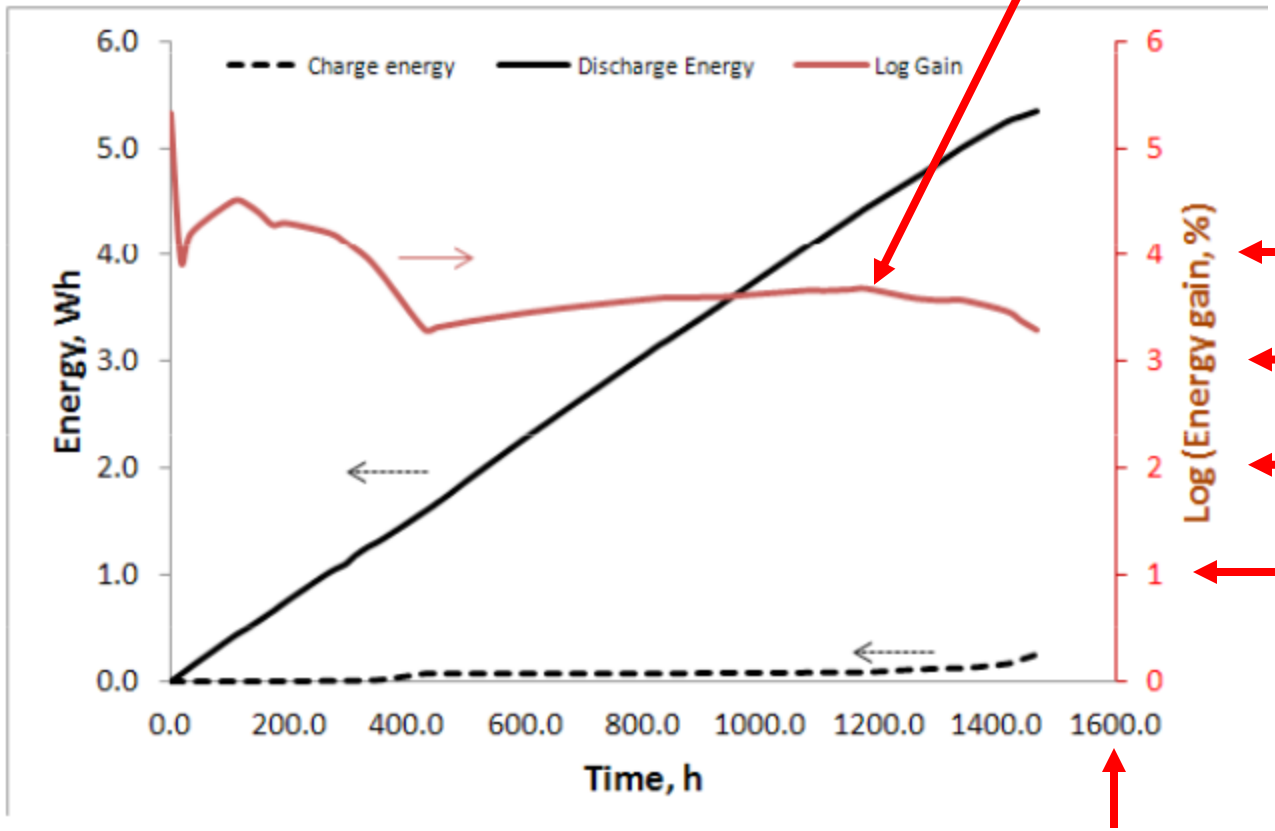


source:
http://blacklightpower.com/

Charge and discharge cycle in BLP's CIHT cell.

For example, at 100% Energy Gain, output is equal to input.

5000% gain;
Output is 50X input here.



Energy Gain

10000%

1000%

100%

10%

66 days

BLP CIHT results of energy output and gain.

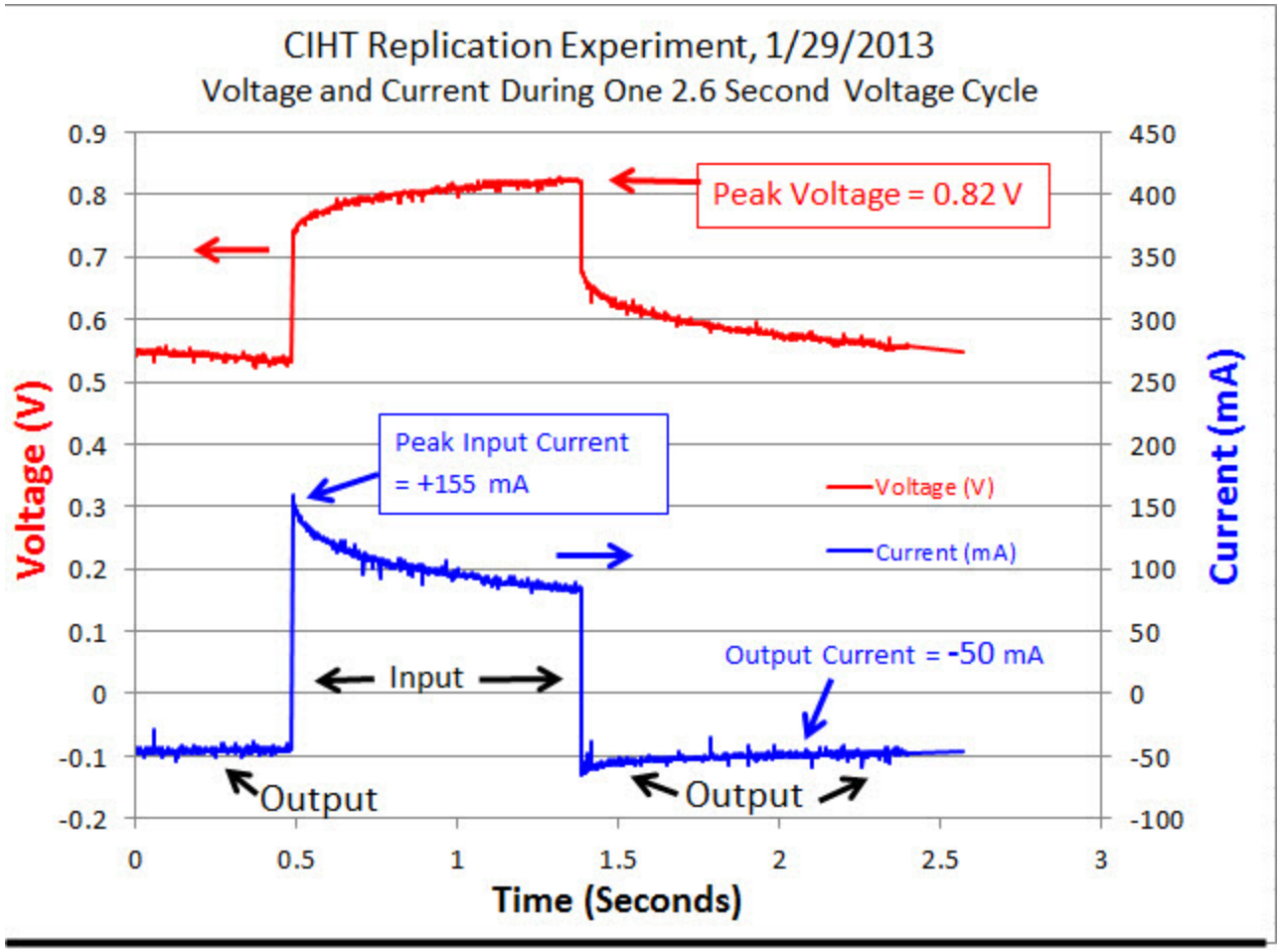
source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

CIHT Replication Experiment
Driscoll, Jan 2013

Full report at:
http://zhydrogen.com/?page_id=620

Full report at:
http://zhydrogen.com/?page_id=620

CIHT
Replication Experiment (J. Driscoll, 2013)



CIHT
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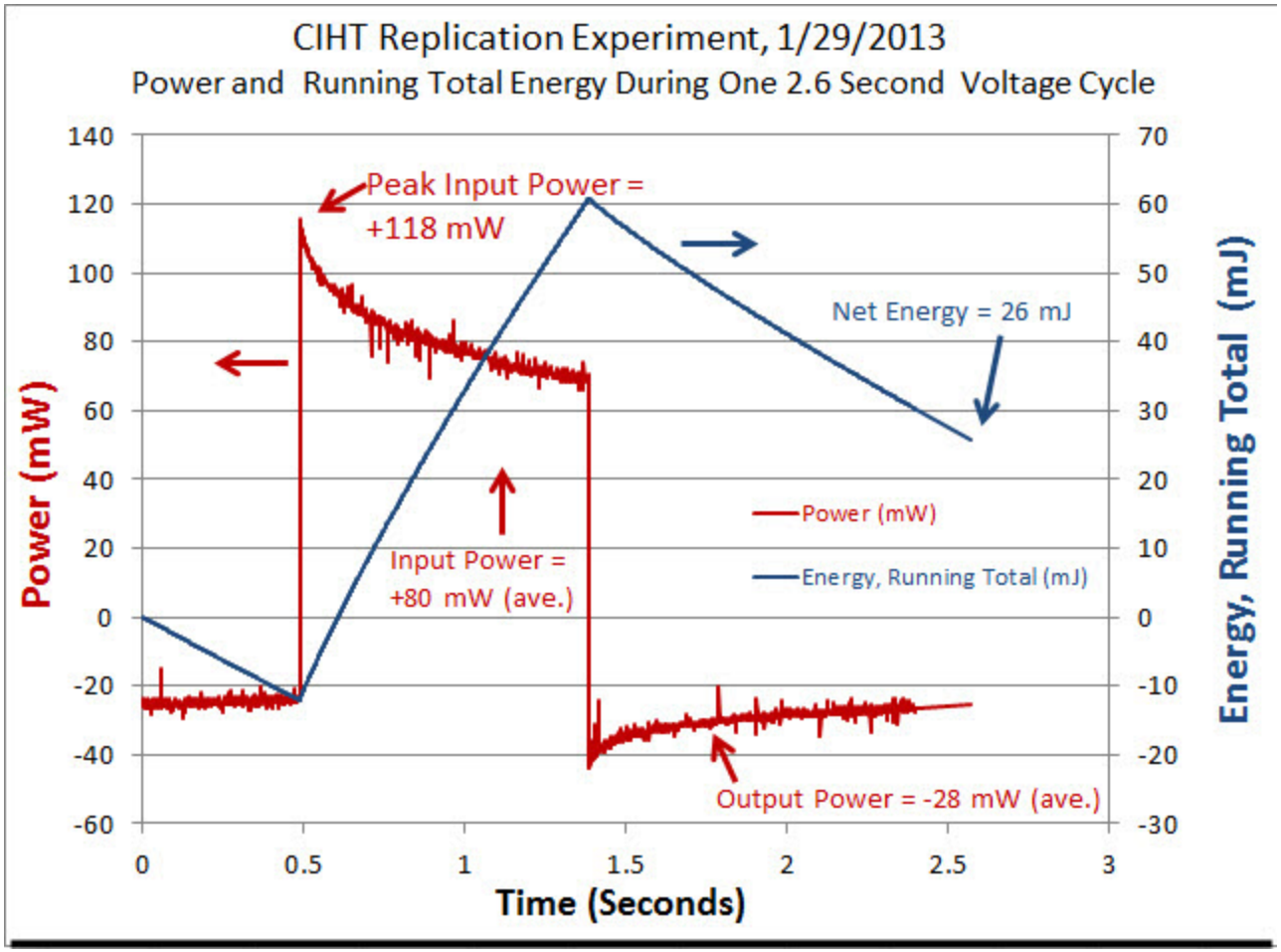
Details at
http://zhydrogen.com



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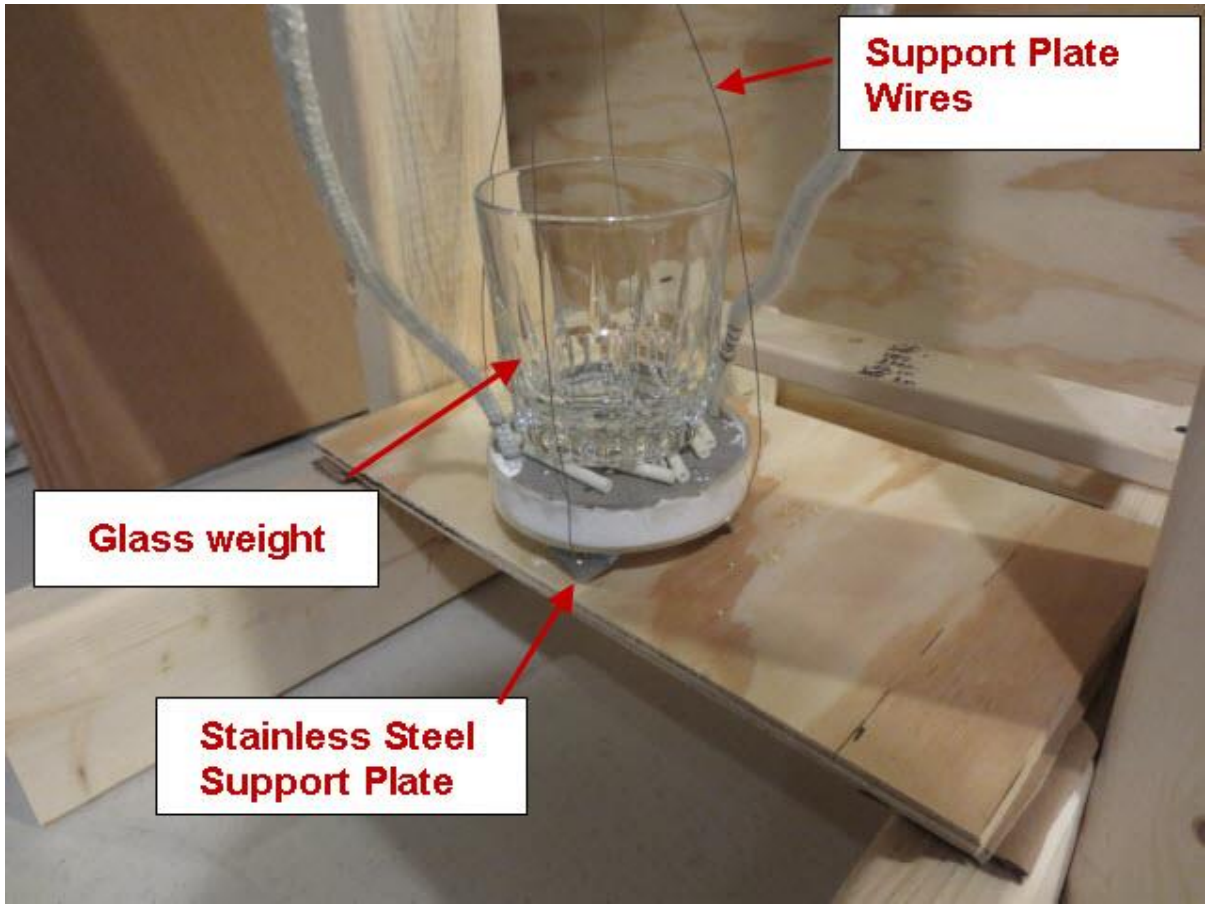

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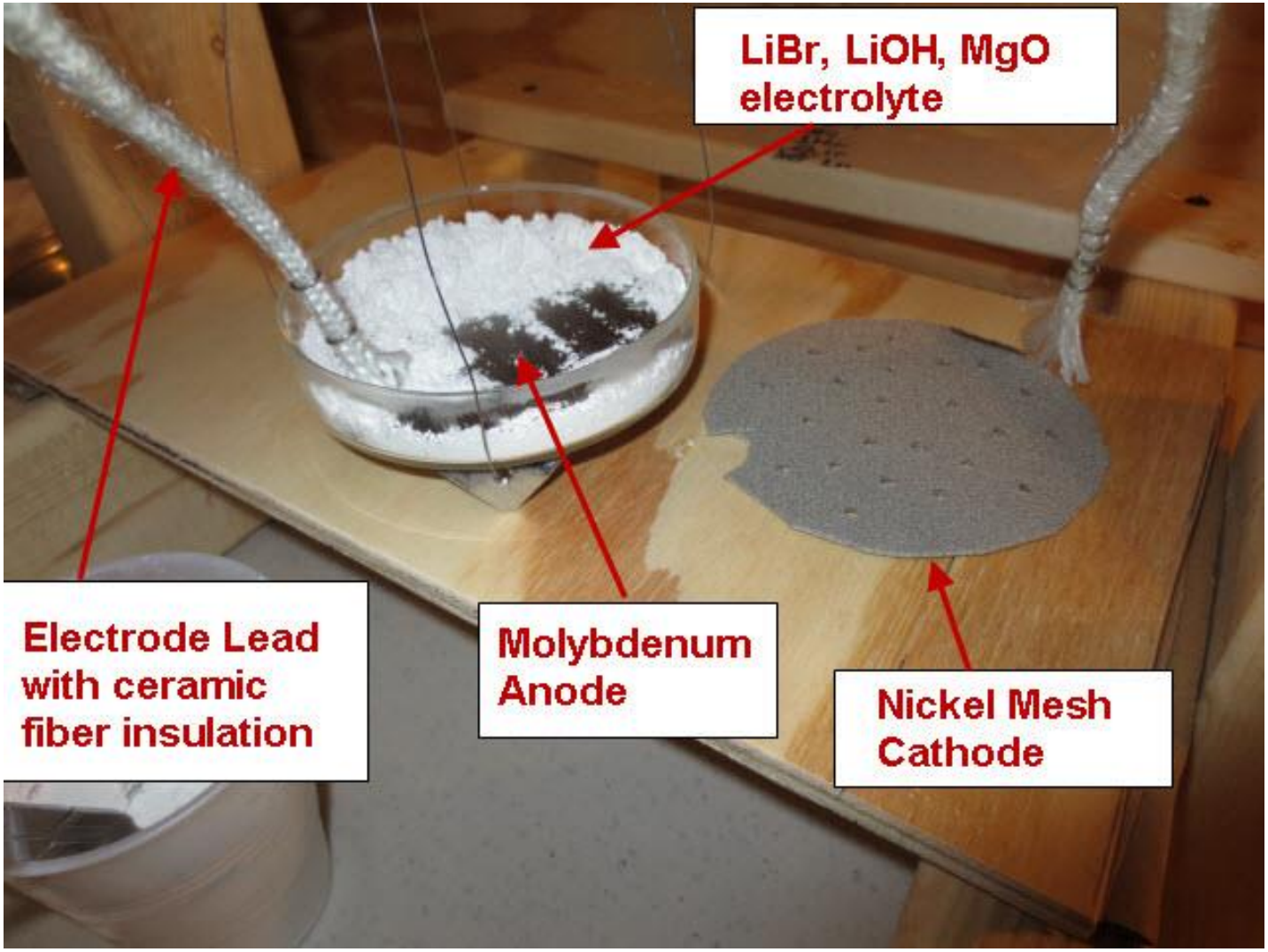
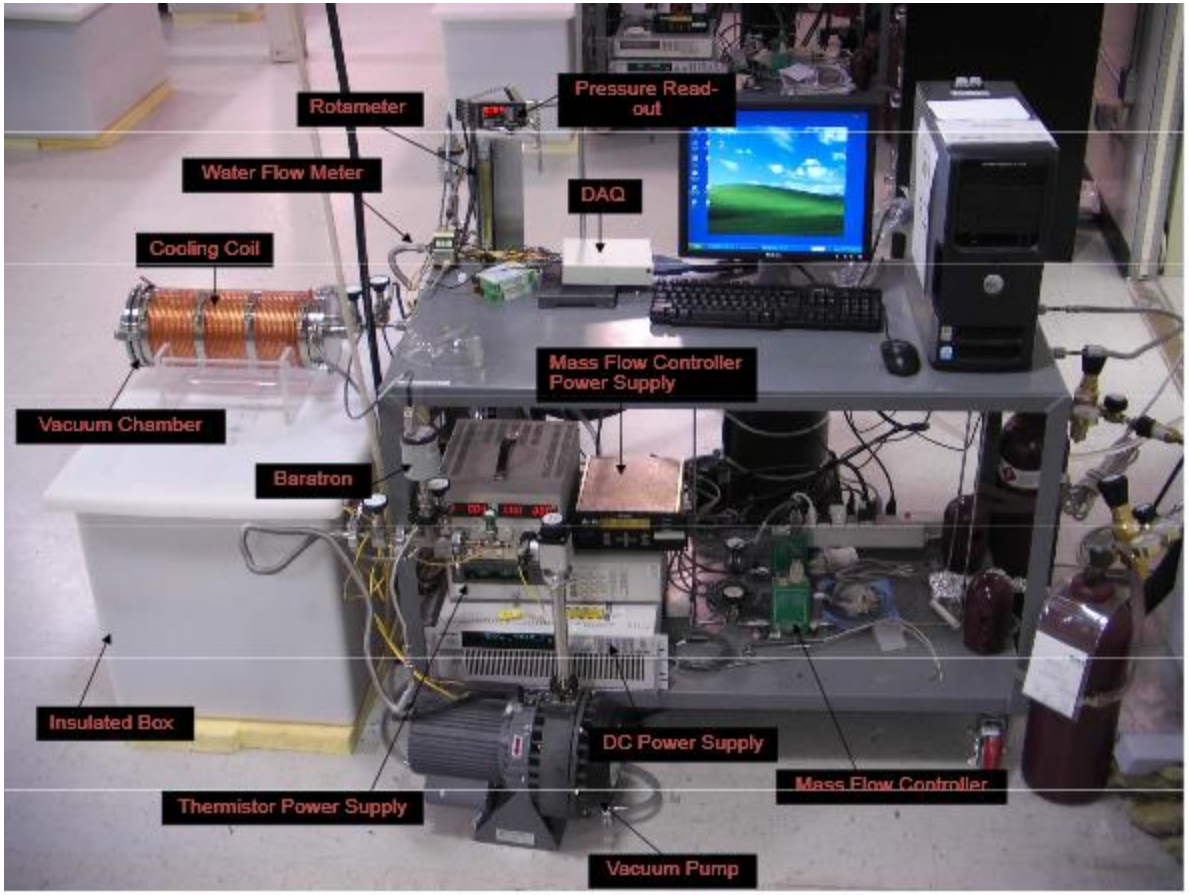


CIHT
Replication Experiment
(J. Driscoll, 2013)

Full report at:
http://zhydrogen.com/?page_id=620

Blacklight Power
Thermal output experiments.



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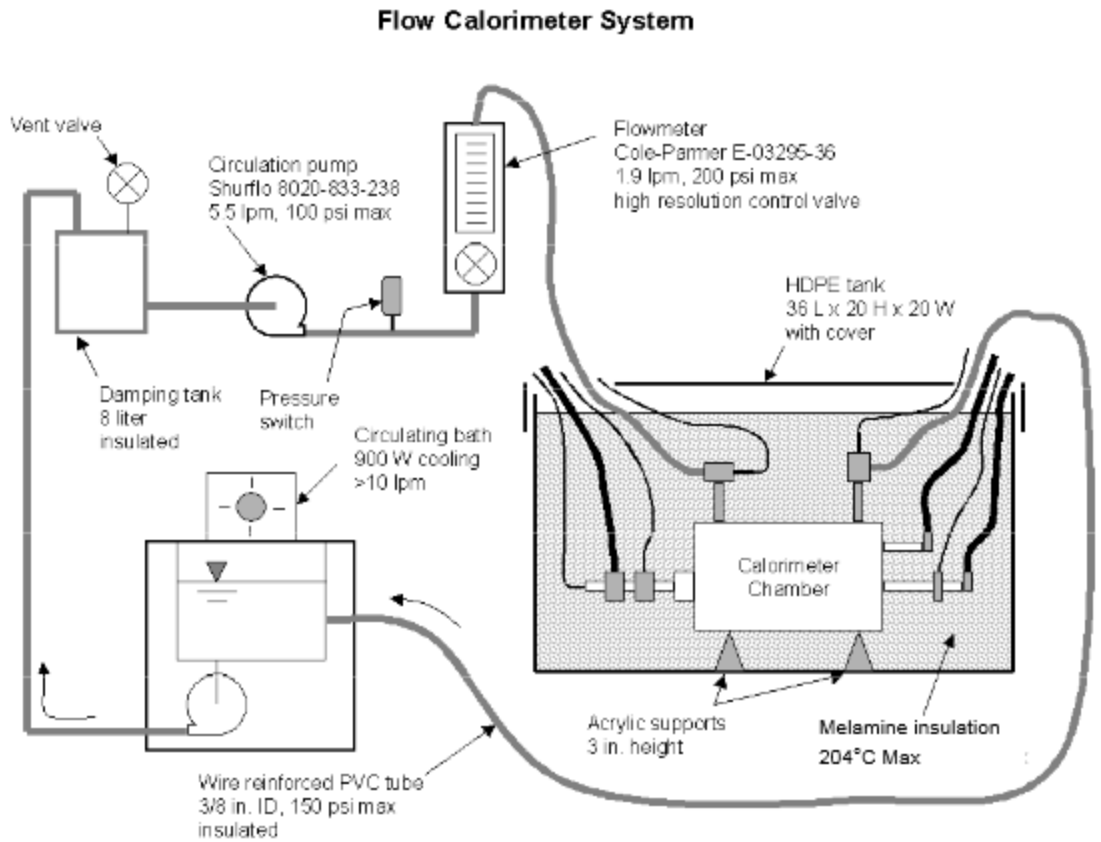
Blacklight Power's thermal experimental setup.



Schematic of the water flow calorimeter used to measure the energy balance of the H_2O catalyst reaction to form hydrinos

Blacklight Power's thermal experimental setup diagram.

source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

Energy Balance of Solid Fuels that Exploit H_2O as the Catalyst

The solid fuel reactants, maximum temperature of the run T, experimental net energy E_{net}, calculated theoretical maximum energy E_{mt} for conventional chemistry and energy gain of hydrino catalyst systems.

Cell No.	Chemicals	T_{max} °C	E_{net} kJ	E_{mt} kJ	Energy Gain
115	6.0g NaOH + 25.0g Fe_2O_3	565	8.7	-0.6	13.6
141	25.0g FeOOH	500.5	6.0	-1.4	4.3
147	6.0g NaOH (semicon grade) + 13.0g FeOOH	540	7.9	-1.4	5.6
166	6.0g NaOH (AD-1) + 25.0g FeOOH	530	10.8	-2.0	5.3
167	6.0g NaOH (semicon grade) + 25.0g FeOOH	571	10.7	-2.0	5.2
171	6.0g NaOH (AD-1) + 25.0g FeOOH (grinder mix)	617	9.3	-2.0	4.7
172	25.0g FeOOH (AD-1)	577	8.8	-1.4	6.3
181[1]	25.0g FeOOH (AD-1)	563	7.4	-1.4	5.3
259	11.6g $Mg(OH)_2$ + 21.6g $FeCl_2$ + 100 psi H_2 (0.0185 moles)	563	17.5	-3.6	4.9
314	4.8g LiOH + 32.3g CoI_2 + 100 psi H_2 (0.0185 moles)	603.4	9.9	-2.8	3.5
324[2]	5.8g $Mg(OH)_2$ + 22.3g $CuBr_2$ + 100 psi H_2 (0.0185 moles)	564.5	11.9	-0.6	19.8
344	5.8g $Mg(OH)_2$ + 30.8g MnI_2 (Alfa) + 100 psi H_2 (0.0185 moles)	614.2	11.4	13.2	inf
353	8.0g $Mg(OH)_2$ + 37.3g SnI_2 + 100 psi H_2 (0.0185 moles)	546	6.9	13.6	inf
361	8.0g $Mg(OH)_2$ + 21.9g $CoBr_2$ +100 psi H_2 (0.0185 moles)	594	10.5	0.9	inf
371	12.2g $Sr(OH)_2$ + 28.7g CuBr + 100 psi H_2 (0.0185 moles)	617.6	14.5	-2.5	5.8
376[3]	12.2g $Sr(OH)_2$ + 13.0g $CoCl_2$ + 100 psi H_2 (0.0185 moles)	662	42.6	-10.3	4.1
382	9.0g $Mg(OH)_2$ + 19.5g YCl_3 + 100 psi H_2 (0.0185 moles)	577	8.8	-1.5	5.9
386	5.8g $Mg(OH)_2$ + 22.3g $CuBr_2$ + 100 psi H_2 (0.0185 moles)	571	6.6	-0.6	11.0
446	9.8g $Cu(OH)_2$ + 15.6g KHF_2 + 104 psi H_2 (0.0185 moles)	494	12.0	-2.2	5.5
460	8.8g $Mg(OH)_2$ + 15.8g $CrCl_3$ + 1 atm Ar	532	9.8	-2.2	4.5
465	9.8g $Cu(OH)_2$ + 21.6g $FeBr_2$ + 1 atm Ar	565	13.9	-1.6	8.7
466	9.8g $Cu(OH)_2$ + 21.9g $NiBr_2$ + 1 atm Ar	591	17.3	-0.9	19.2
467[4]	9.8g $Cu(OH)_2$ + 21.9g $CoBr_2$ + 1 atm Ar	576	12	-1.1	10.9
468	9.8g $Cu(OH)_2$ + 13.0g $NiCl_2$ + 1 atm Ar	552	8.7	0.6	inf
469	9.8g $Cu(OH)_2$ + 21.5g $MnBr_2$ + 1 atm Ar	602.7	14.2	9.8	inf
470[5]	9.8g $Cu(OH)_2$ + 27.9g $SnBr_2$ + 1atm Ar	598	16.4	-1.5	10.9

[1] Thermal burst observed 150-170 °C
[2] Thermal burst observed 190-245 °C
[3] Thermal burst observed 77-403 °C
[4] Thermal burst observed 81-241°C
[5] Thermal burst observed 71-152 °C

Blacklight Power's thermal output data.

source:
http://blacklightpower.com/wp-content/uploads/presentations/TechnicalPresentation.pdf

1st electron ionization energy

2nd electron ionization energy

3rd electron ionization energy

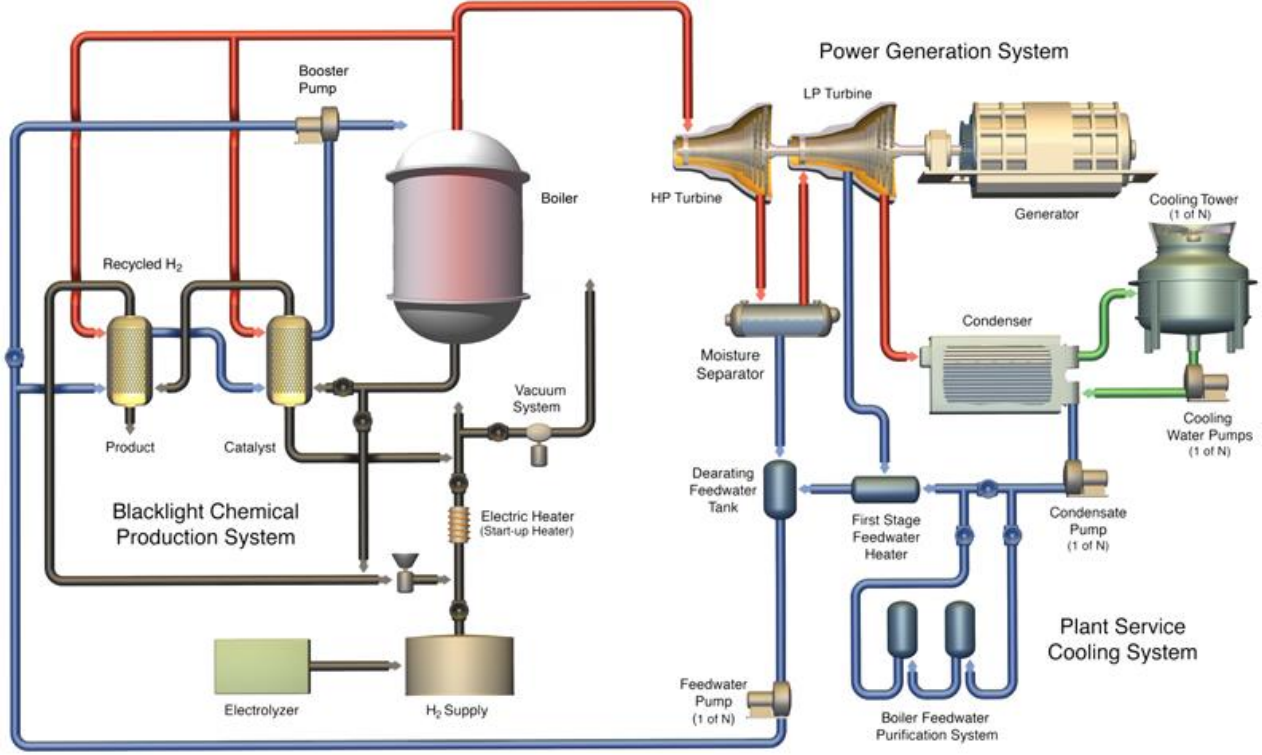
Total

m x 27.2 eV

Table 5.2. Hydrogen Catalysts.

Catalyst	IP1	IP2	IP3	IP4	IP5	IP6	IP7	IP8	Enthalpy	m
Li	5.39172	75.6402							81.032	3
Be	9.32263	18.2112							27.534	1
K	4.34066	31.63	45.806						81.777	3
Ca	6.11316	11.8717	50.9131	67.27					136.17	5
Ti	6.8282	13.5755	27.4917	43.267	99.3				190.46	7
V	6.7463	14.66	29.311	46.709	65.2817				162.71	6
Cr	6.76664	16.4857	30.96						54.212	2
Mn	7.43402	15.64	33.668	51.2					107.94	4
Fe	7.9024	16.1878	30.652						54.742	2
Fe	7.9024	16.1878	30.652	54.8					109.54	4
Co	7.881	17.083	33.5	51.3					109.76	4
Co	7.881	17.083	33.5	51.3	79.5				189.26	7
Ni	7.6398	18.1688	35.19	54.9	76.06				191.96	7
Ni	7.6398	18.1688	35.19	54.9	76.06	108			299.96	11
Cu	7.72638	20.2924							28.019	1
Zn	9.39405	17.9644							27.358	1
Zn	9.39405	17.9644	39.723	59.4	82.6	108	134	174	625.08	23
As	9.8152	18.633	28.351	50.13	62.63	127.6			297.16	11
Se	9.75238	21.19	30.8204	42.945	68.3	81.7	155.4		410.11	15
Kr	13.9996	24.3599	36.95	52.5	64.7	78.5			271.01	10
Kr	13.9996	24.3599	36.95	52.5	64.7	78.5	111		382.01	14
Rb	4.17713	27.285	40	52.6	71	84.4	99.2		378.66	14
Rb	4.17713	27.285	40	52.6	71	84.4	99.2	136	514.66	19
Sr	5.69484	11.0301	42.89	57	71.6				188.21	7
Nb	6.75885	14.32	25.04	38.3	50.55				134.97	5
Mo	7.09243	16.16	27.13	46.4	54.49	68.8276			220.10	8
Mo	7.09243	16.16	27.13	46.4	54.49	68.8276	125.664	143.6	489.36	18
Pd	8.3369	19.43							27.767	1
Sn	7.34381	14.6323	30.5026	40.735	72.28				165.49	6
Te	9.0096	18.6							27.61	1
Te	9.0096	18.6	27.96						55.57	2
Cs	3.8939	23.1575							27.051	1

BLP's list of catalysts and their electron ionization energies. From Mills's GUTCP book (Grand Unified Theory of Classical Physics).



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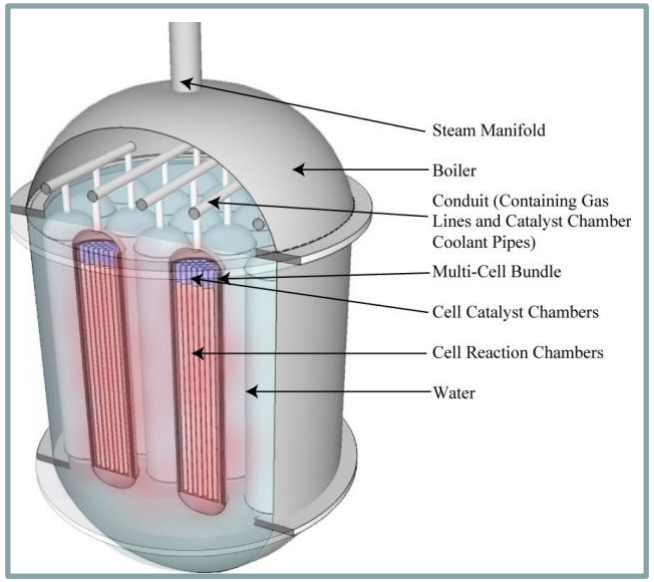
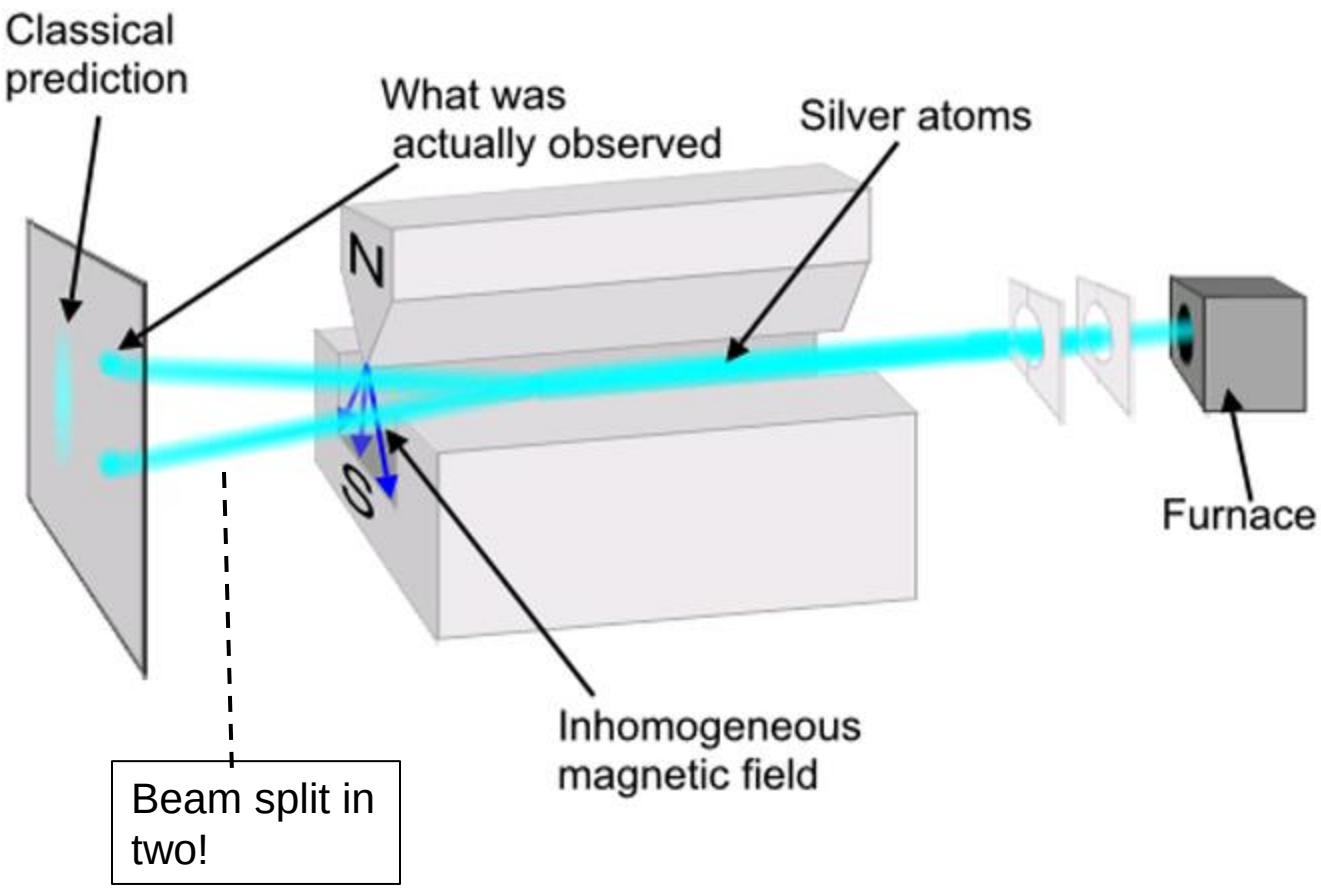


Electricity costs using BLP thermal technology would be less than 30% that of a natural gas fired plant and have zero CO2 emissions.

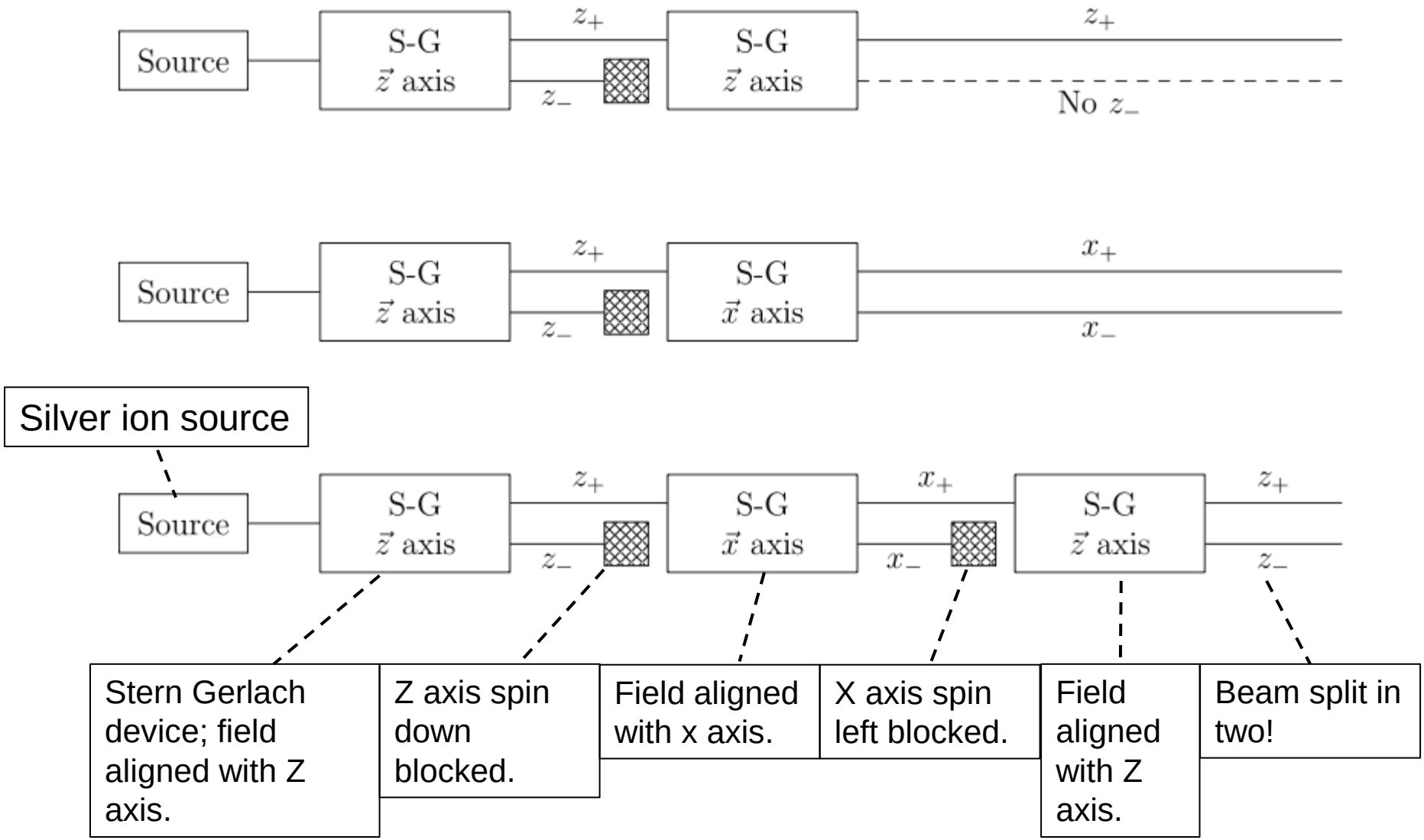
Blacklight Power's Solid Fuel Reactor

Blacklight Power: Explanation of famous experiments in history

Stern Gerlach Experiment, 1922



Stern Gerlach experiment from 1922 is explained using first principles and no quantum spin factor. Precession due to the electric currents traveling on the surface of the orbitsphere interacting with the magnetic field result in the beam splitting in two.



Stern Gerlach experiment results are explained using first principles and no quantum spin factor. Above is a schematic of the results from the experiment.

Fine Structure Constant

Fine Structure Constant (alpha) = α = 1 / 137.035999

"It's one of the greatest damn mysteries of physics: A magic number with no understanding by man"

"we don't know what .... to do... to make this number come out- without putting it in secretly"

Richard Feyman

Mills's theory explains link between:

- Fine structure constant, α (alpha)
- Speed of light, **c**
- Electron rest mass, **m**

Fine Structure Constant = 1 / 137.035999

The explanation of this number is a big mystery in science.

==========

Mills's explanation of the Fine Structure Constant

•Smallest possible fractional orbit state in Mills's theory (at particle production)

•Rest mass of electron (in terms of energy) is exactly equal to the potential energy of an electron evaluated between infinity and fractional orbit state **n** = 1 / 137.035999.

•At orbit state **n** = 1 / 137.035999, the infinitesimal charge currents on the orbitsphere travel at a velocity equal to **c**, the speed of light.

•An electron that reaches this orbit will transition into a photon.

Principal orbit state of hydrogen atom

Fine structure constant

Energy for selected values of n.
Randell Mills model of the atom.

n	Kinetic Energy (eV)	Potential Energy (eV)	Total Energy (eV)	Electron Orbit Velocity (m/s)	Fraction of Speed of light dimensionless
$\frac{1}{137.0359997}$	255499.448	-510998.896	-255499.448	299792458	1.00000000
$\frac{1}{137}$	255365	-510730	-255365	299713701	0.9997
$\frac{1}{60}$	48980	-97961	-48980	131261475	0.4378
$\frac{1}{10}$	1360.6	-2721.1	-1360.6	21876912	0.07297
$\frac{1}{4}$	217.69	-435.38	-217.69	8750765	0.02918
$\frac{1}{3}$	122.45	-244.90	-122.45	6563073	0.02189
$\frac{1}{2}$	54.423	-108.84	-54.423	4375382	0.01459
1	13.606	-27.211	-13.606	2187691	0.007297
2	3.401	-6.803	-3.401	1093845	0.003649
3	1.512	-3.023	-1.512	729230	0.002432
4	0.850	-1.701	-0.850	546922	0.001824
infinity	0	0	0	0	0

Notice at n = 1/137.0359997 that the potential energy is exactly equal to the electron's rest mass of 510998.896 eV and that the velocity of the electron is exactly equal to the speed of light.

Fine structure constant, $n = {}^{1}/_{137.035999}$ has prominent part in Mills's theory as seen in table above.

Analogy: A dropped ball converts Potential Energy (P.E.) into Kinetic Energy (K.E.) and air friction losses (E_{losses}) and Conservation of Energy says that the total change in energy sums to zero (i.e. energy is neither created nor destroyed, it just changes form).

$$\Delta E = 0 = \Delta P.E. + \Delta K.E. + E_{Losses}$$

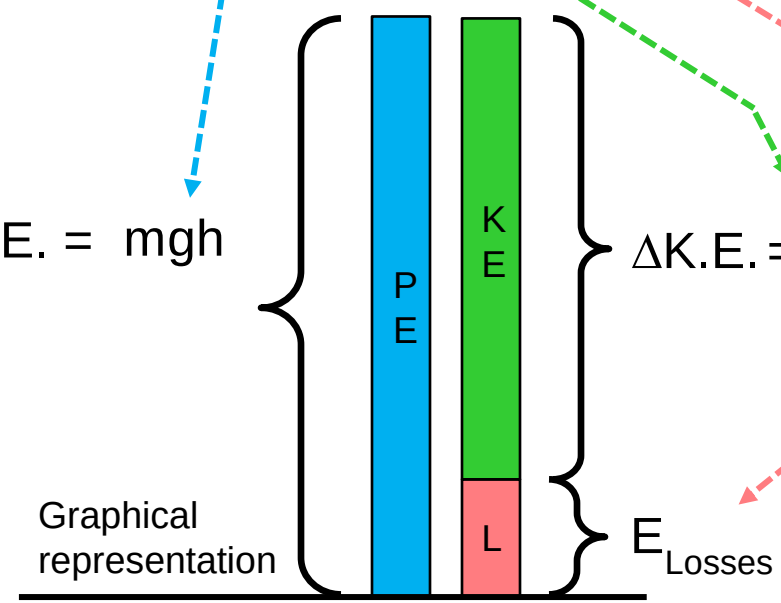
$$-\Delta P.E. = \Delta K.E. + E_{Losses}$$

$$mgh = \frac{1}{2}mv^2 + E_{Losses}$$

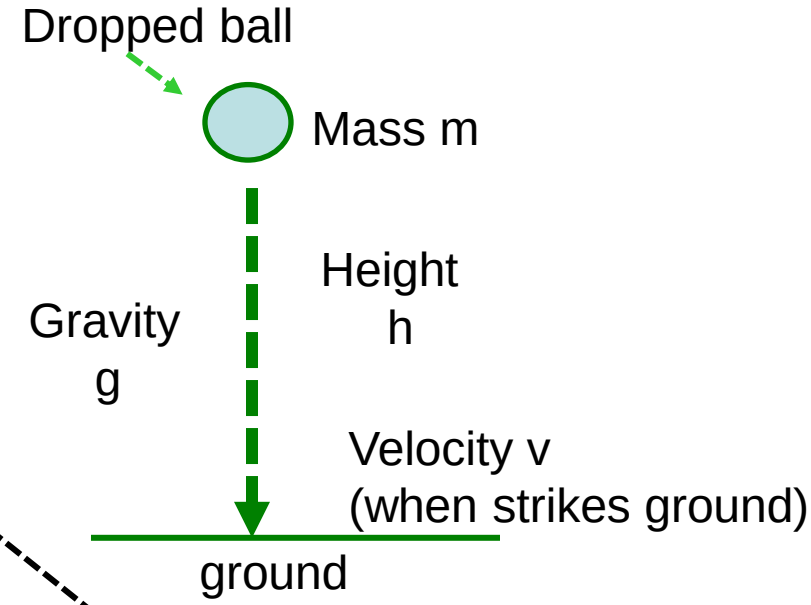
$$-\Delta P.E. = mgh$$

$$\Delta K.E. = \frac{1}{2}mv^2$$

$$E_{Losses}$$



Graphical representation



Or if there is no air friction losses

$$-\Delta P.E. = \Delta K.E.$$

$$mgh = \frac{1}{2}mv^2$$

In the hydrogen atom, an electron "falling" from orbit state $\mathbf{n_i}$ = infinity to $\mathbf{n_f}$ = 1/137.035999 (i.e. $\mathbf{n_f} = \alpha$ or alpha, the fine structure constant) converts Potential Energy (P.E.) into Radiation Energy (E_{Rad}) and Kinetic Energy (K.E.).

Using Bohr Model equations (which are the same as Mills's equations):

Electron's rest mass!

Change in Potential Energy:

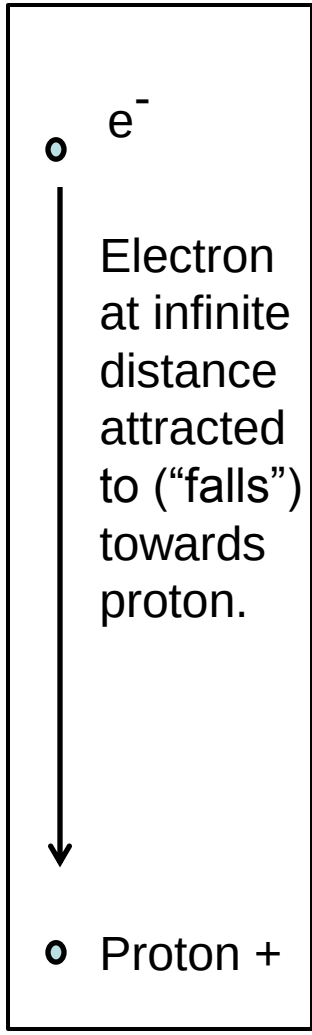
$$\Delta P.E. = P.E._{final} - P.E._{inital} = -\frac{k_e e^2}{n_{final}^2 a_0} - \left(-\frac{k_e e^2}{n_{initial}^2 a_0}\right) = -510998.896 \text{ eV}$$

Change in Kinetic Energy:

$$\Delta K.E. = K.E._{final} - K.E._{inital} = \frac{k_e e^2}{2 n_{final}^2 a_0} - \frac{k_e e^2}{2 n_{initial}^2 a_0} = 255499.448 \text{ eV}$$

Radiation emitted energy E_{RAD} :

$$E_{Rad} = -(E_{final} - E_{initial}) = -\frac{k_e e^2}{2 n_{initial}^2 a_0} - \left(-\frac{k_e e^2}{2 n_{final}^2 a_0}\right) = 255499.448 \text{ eV}$$



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$$\Delta E = 0 = \Delta P.E. + E_{Rad} + \Delta K.E.$$ Conservation of Energy

$$-\Delta P.E. = E_{Rad} + \Delta K.E.$$

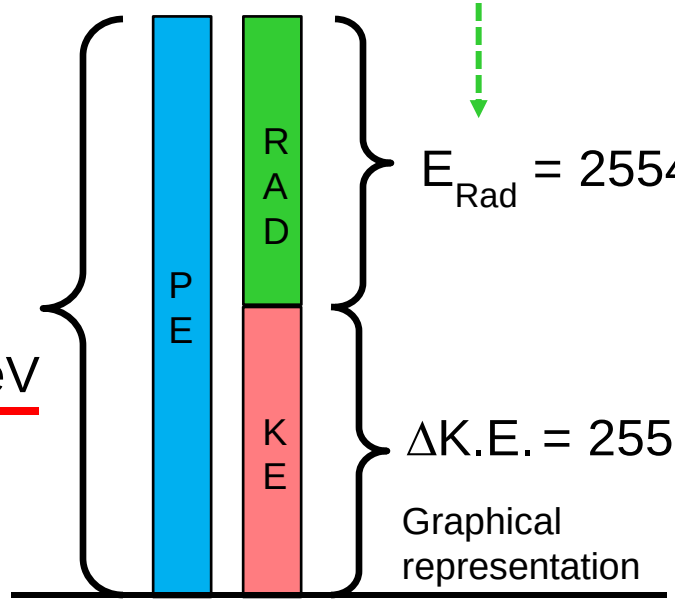
Electron change in Potential Energy = Radiation emitted from Hydrogen atom + Electron change in Kinetic Energy

$$-(-510998.896\ eV) = 255499.448\ eV + 255499.448\ eV$$

$-\Delta P.E. =$

510998.896 eV

Electron's rest mass!



$E_{Rad} = 255499.448\ eV$

$\Delta K.E. = 255499.448\ eV$

Graphical representation

Also, the velocity of the electron in the hydrogen atom is exactly equal to the speed of light **c** at orbit state $\mathbf{n_f}$ = 1/137.035999 (i.e. $\mathbf{n_f} = \alpha$, or alpha)

Setting $\mathbf{n_f} = \alpha$ in Equation 49 and using Equation 50 (from zhydrogen.com) for the fine structure constant:

$$\text{Electron velocity} = v = \frac{(2\pi)\, e^2\, k_e}{n\, h} \qquad \text{(Eq. 49)}$$

Setting $n = \alpha$ where

$$\alpha = \frac{e^2\, k_e\, (2\pi)}{h\, c} \qquad \text{(Eq. 50)}$$

Gives

$$\boxed{\text{Electron velocity} = v = \frac{(2\pi)\, e^2\, k_e\, h\, c}{h\, e^2\, k_e (2\pi)} = c}$$

The electron velocity equals the speed of light at orbit state $\mathbf{n_f}$ = 1/137.035999 !

The rest mass of the electron from Einstein's famous equation:

$$E = m\,c^2 = (9.10938215 \times 10^{-31}\ \text{kg})\ \times\ (299792458\ \text{m/s})^2$$

$$= 2.73092407 \times 10^{-22}\ \text{kg}\,\text{m}^2/\text{s}^2$$

$$\boxed{= 510998.896\ \text{eV}}$$

rest mass of the electron after conversion to eV units. It is equal to the change in potential energy for an electron that "falls" from infinity to n = 1/137.059997

Summarizing in a different way:

If Bohr Model equations combined with fractional orbits are used to calculate the orbit that results in the electron traveling at the speed of light **c**, then the following occurs:

1.The orbit state is exactly equal to the fine structure constant, α (or alpha, **n** = 1/137.035999)

2.The change in potential energy (starting from n = infinity) is exactly equal to the rest mass of the electron.

$$-\Delta P.E. = 510998.896 \text{ eV}$$

(Note: Mills's equations for electron Potential Energy, Kinetic Energy, Total Energy are the same as Bohr Model equations but the allowed orbits are different – namely Mills allows fractional principal orbit states.).

What are the chances that 3 constants and an equation for Potential Energy are perfectly connected in a classical physics way for the hydrogen atom?

c = 299792458 m/s = speed of light

α = 1/137.035999 = alpha or the fine structure constant

m = 9.10938215 x 10^{-31} kg = electron's rest mass

$$\Delta P.E. = -\frac{k_e e^2}{n_{final}^2 a_0}$$

There must be something to fractional orbit states!

But…

- An electron does not fall from infinity all the way to n = 1/137.035999 and become a photon in conditions found here on earth (i.e. 100% of mass converted to radiation energy) though it may occur in conditions found in outer space.
- The exact reverse mechanism can happen here on earth where a 1.02 MeV (or higher energy) photon strikes a nucleus which creates a 511 eV electron and 511 eV positron. In this case radiation energy has been converted to mass. See chapter on “Particle Production” in Mills’s GUTCP book.