Electrical catalyst

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Abstract

Description of a fictional device, cylindrical in shape, for starting a low energy nuclear reaction. Using an environment of hydrogen and nickel charecteristics, similiar to one in an E-Cat. Imagining hydrogen molecul as a spring resonant system and simply using frequency and power of electricity as a catalyst.

1 Introduction

I won't spend much time discussing the nuclear reaction from Ni^{58} to Cu^{63} and from Ni^{64} to Cu^{65}, because a well written paper [1] from Dr. Andrea Rossi and prof. Sergio Focardi is sufficiently describing the process taking place on atomic level. There is also quite some articles written on *Journal of Nuclear Physics* site about the capturing of proton, I especially like the explanation with the drawing of the masked proton [2] entering the nickel nuclei written from Dr. Giuliano Bettini.

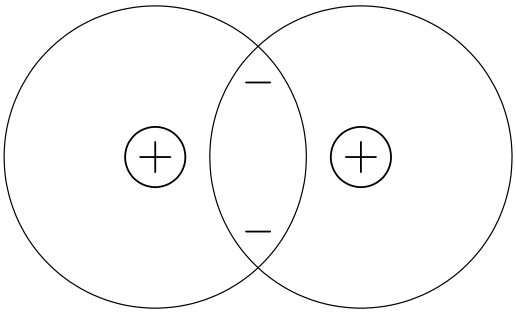

Figure 1: H_2 molecul shematicly drawn

My focus will be on the two part puzzle. Process of turning H_2 molecul into atomatised state of H atom and the second stage dealing with a method of applying sufficient energy pressure for starting low nuclear reaction.

2 Playing elastic with H_2

The device described produces single hydrogen atoms with high kinetic energy. With the help of electron shielding, proton enters nickel nuclei and activates low nuclear reaction.

As we look at the hydrogen molecul, let's look at it as a system. Transformed into a linear system like in *Fig. 2.* We have a chemical bond holding

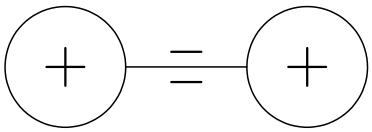

Figure 2: H_2 molecul as a linear system

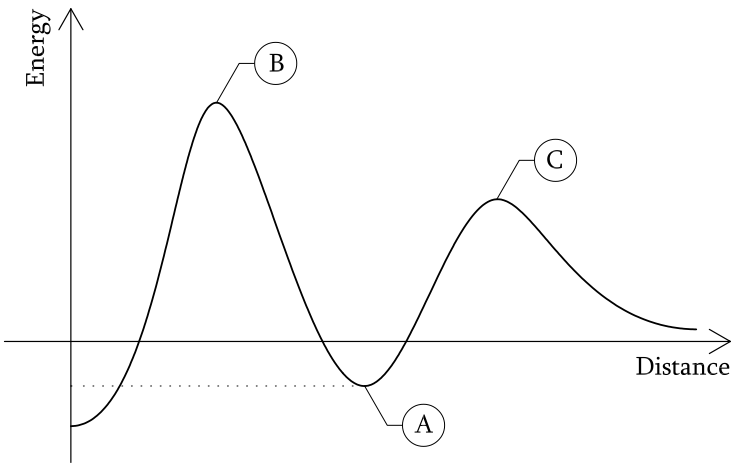

Figure 3: Energy in function of distance between H atoms in H_2 molecul

two atoms together, this we clearly see in the *E(d)* graph in *Fig. 3.* Explanation of the crucial points of graph would be:

- ▷ point A is point where H_2 molecul is happily situated

▷ point B is peak of Coloumb barrier, energy needed for real hydrogen fusion to occur

▷ point C is barrier of electron chemical bond, holding H_2 molecul together

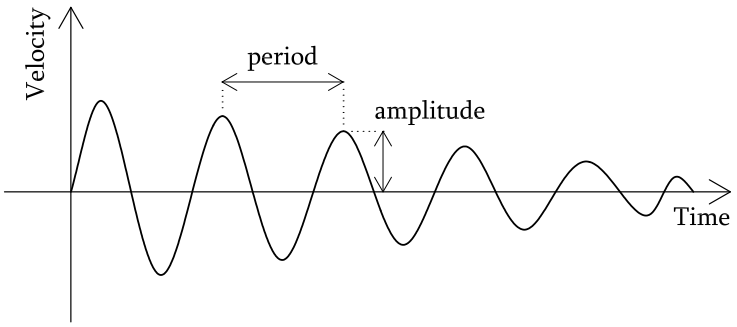

Figure 4: Velocity of a marble ball droping in time

Let's think how it would be possible to get H_2 molecul out of the valley between two hills B (Coloumb barrier of fusion) and hill C (electron bond). If we have a marble ball and we let it roll down the hill C to the valley A and back up the hill B, we get a graph *v(t)* similiar to this in *Fig. 4*.

Because the "hill" of *E(d)* of H_2 molecul is let's say parabolic (continious) in line, we get a harmonic motion of a marble ball, which is slowly losing potential energy from the top of the hill C. Losing of energy occurs because of the resistance of air and because of the friction with the ground.

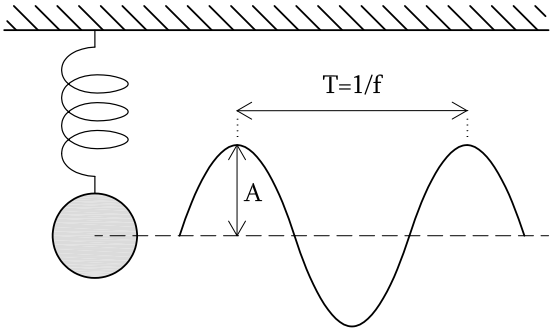

Figure 5: Spring resonant system

If we think of a simple harmonic motion, sinusoidal motion in time, we might think of a oscillator made of a spring and a mass attached to it.

With the prediction that spring has very small mass and that there is no air resistance and no friction with the ground, we can say this is a simple harmonic motion system, with a simple resonate frequency, described with equations below.

$$F = -kx \tag{1}$$

Hook's law: *elasticity is property of a spring, it takes twice as much force to strech a spring twice as far.*

$$y = Asin\omega t = Asin\sqrt{\frac{k}{m}}t \tag{2}$$

k *is the spring constant, describing linear dependence of force and distance of strech.*

$$E = K_E + P_E = \frac{1}{2}kA^2 \tag{3}$$

Total energy for an undamped oscilator!

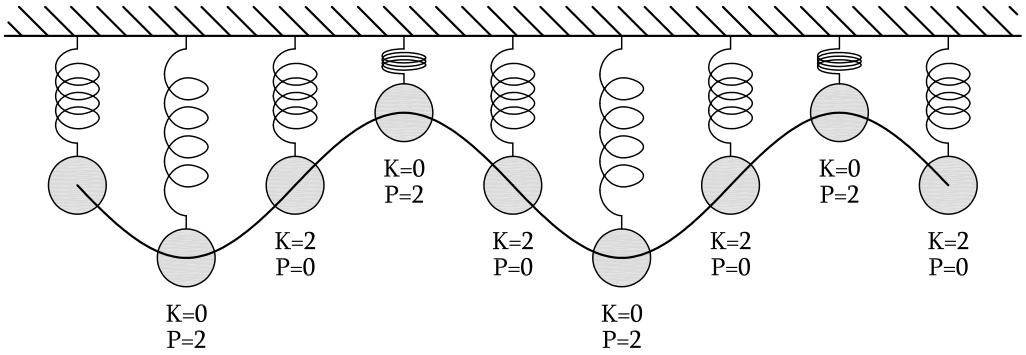

Figure 6: Sum of kinetic and potential energy is constant

If we apply a sinusoidal driving force with a resonant frequency of the spring oscillator, the spring amplitude will build up to the point where it is limited by the damping forces of the system. If the damping forces are small, a resonant system can come to the critical moment when the spring breaks apart.

So we can easly push our marble ball from the bottom of valley A over the hill C in *Fig. 3.* By applying tiny push on the marble ball each time it stops on hills B and C and building up needed energy to eventually overcome hill C. Hill C is smaller in height, that's why marble ball will roll over it first, no real ***fusion*** this time**!**

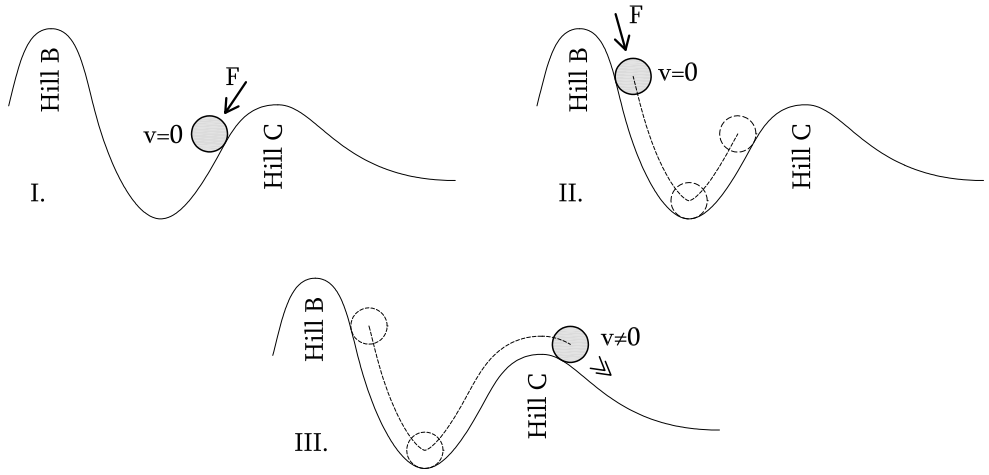

Figure 7: Rolling Marble Ball

But our H_2 molecul is very small, hard to push with fingers or hands. Let's take a look at H_2 molecul again, we could say it is a linear system of 2 protons and a bond made of 2 electrons, *Fig. 2*. The closer the protons the bigger the reppeling force, the more distant from each other the stronger the attraction force of electrons. We can conclude that our H_2 molecul is acting like two springs with masses on each end. We can say we have a double spring system attached to the "wall" in between as seen in *Fig. 8*. With little or zero damping and very small mass *(electrons)* of spring itself.

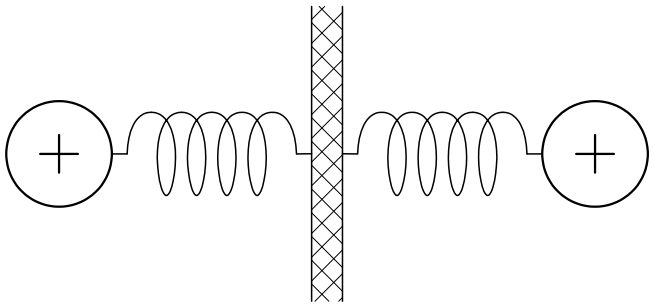

Figure 8: Concrete wall between protons

If we manage to apply a resonant frequency force to it, even very tiny one, eventually spring *(electric bond)* will break, leaving 2 H atoms with great kinetic energy. Just what we have been looking for!

3 Electricity working in a circuit

How do we apply resonant frequency force to molecul? The method of electrical catalyst comes on stage at this moment. Let's imagen H_2 molecul again, *Fig. 9*. Now imagen putting this molecul between two metal plates, sometimes recognized as a capacitor.

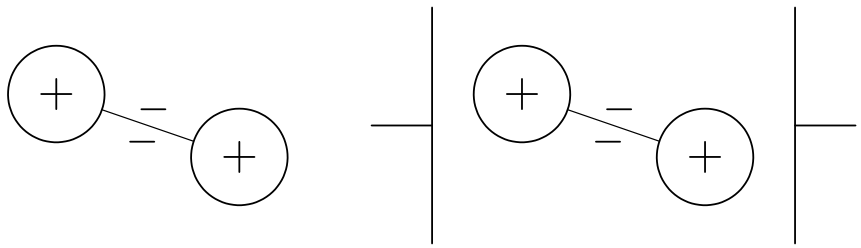

Figure 9: Free H_2 *and* H_2 in an ambush!

If it would be a classical capacitor we would have positive charge on one plate and negative on other. But let's do something different. Let's build up a strong negative charge on both plates simultaneously and see what happens, *Fig. 10*.

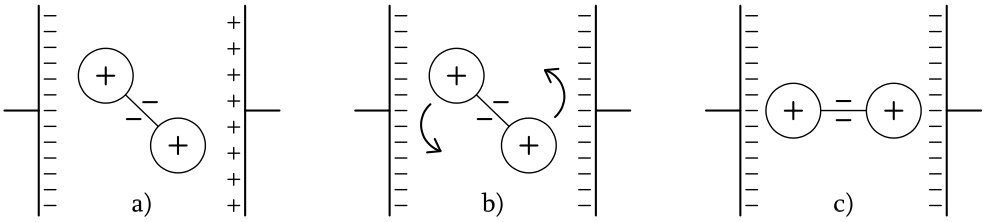

Figure 10: a) normal b) system rotating c) H_2 fixed in position

The negative charge on plates attratcs the protons and causes H_2 molecul to rotate so that it's chemical bond is perpendicular to both plates. The attractive force of negative charge puts H_2 molecul out of equalibrium, protons are pushed away from each other for some very small change in distance D.

Discharging the plates, we let the protons fly back to equalibrium, back towards each other. We can imagen how H_2 molecul starts to oscillate, *Fig. 11*. Since there is no air resistance between protons, no friction, no any kind of resistance that I can think of, we can say H_2 molecul system is almost perfect undamped oscillator.

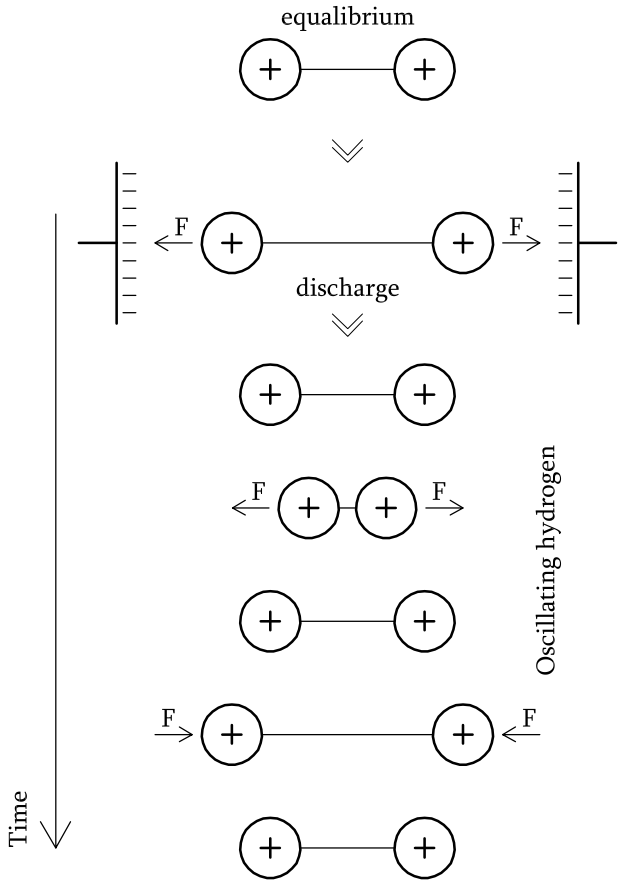

Figure 11: Oscillating H_2

AC current has sinusoidal character, therefore applying it to capacitor the charge will go up and down in sinusoidal function. Building the charge, with resonant frequency, making H_2 system to resonate and eventually causing molecul to break into 2 H atoms with great ***kinetic*** energy. I think this happens some half an hour after the ignition of the E-Cat modul.

$$f = \frac{1}{2n} f_o \tag{4}$$

Due to almost zero damping of our H_2 oscilating system, I would say that we even don't have to apply the **exact** resonant frequency to H_2 system but can choose some that fits the equation (4), where f_o is resonant frequency and $\boldsymbol{n}$ a natural number. The resonant frequency of H_2 system must be very high.

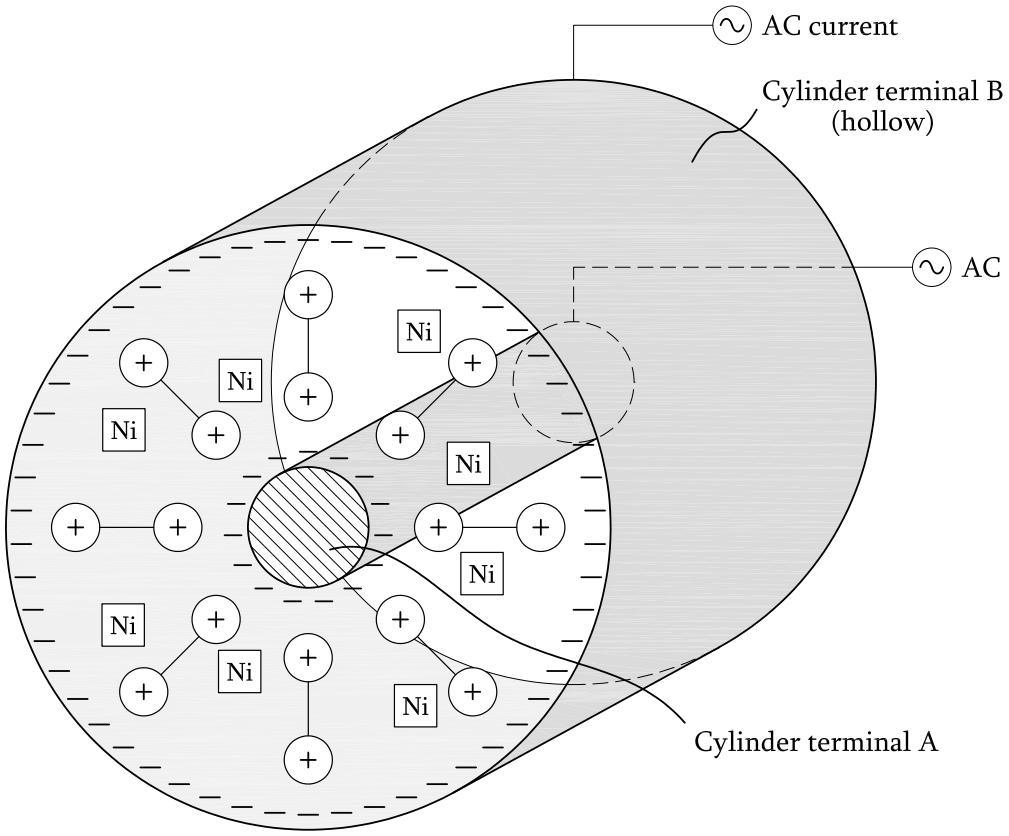

Figure 12: Section of the fictional reactor

A very simple shematic sketch of how this cylindrical reactor could be built up in my opinion is shown in *Fig. 12*. A cylinder "capacitor" terminal in the middle of a hollow cylinder "capacitor", in the space between there is hydrogen with nickel dust.

Cylinder terminals A and B must have suficient charge Q in dependence to S surface. To pull the protons with equal force towards inner and outer side of reactor, equation (5) must be fulfilled.

$$\frac{Q_A}{S_A} = \frac{Q_B}{S_B} \tag{5}$$

Because of this condition control panel with electronics must bring different currents and/or voltage values on cylinder terminals A and B. We can build up amplitude only with negative charge, because a positive charge does not stay on the inner side of a hollow bodies, but rather skips on the outer

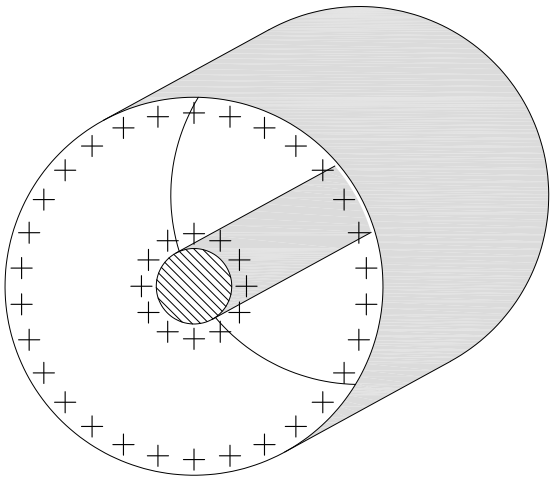

Figure 13: Impossible

surface. Picture in *Fig. 13* never happens. That's why this fictional reactor can only pull protons apart and is not able to push them together!

4 Tips and tricks

Some remarks and guesses on how reactor would function in real world:

- ▷ Pressure of hydrogen in reactor is playing a key role at lowering the spring constant k of our oscillating H_2 system, allowing generator to work at lower AC current frequencies. Temperature in my opinion has a similiar role.
- ▷ Nickel has to be put in reactor as powder, because it is good that as many particles are flowing around the volume of the reactor. So that H atom with high kinetic energy hits and enters nickel nuclei as many times as possible.
- ▷ Reactor can work in self sustained mode for some time, which is a result of almost zero damping forces present in H_2 oscilating system.
- ▷ Electronics in control panel take care of right currents, right frequency and voltage to be sent on cylinder terminals A and B. Control panel is probably the heaviest part of the generator as whole, it might have some inductors in it.

- ▷ Frequencies might have to be fixed during the building of the amplitude for reaching reaction point of LENR. Periodic motion of H_2 oscillating system might get anharmonic at some point.

- ▷ It is possible to close down reactor tube completely, putting in enough hydrogen and nickel, sealing it under the right pressure. The whole reactor tube can be like a battery in a hand light, simply replaceable.

5 Conclusions

A simple spring toy can reveal wonderful things, if you just know how to play. Spring is always fun to play with but transforming nickel into copper is promising ... This fictional reactor is not only producing great amounts of energy from matter, but seems to be transforming charecteristics of our material world.
Thinking out of the box is the real catalyst for transforming matter into gold!

References

[1] Rossi, A. and Focardi, S.: *A new energy source from nuclear fusion* (online). March, 2010. (Cited 29.04.2012) Available at http://journal-of-nuclear-physics.com

[2] Bettini, G.: *How can 30% of nickel in Rossi's reactor be transmuted into copper?*(online). April, 2011. (Cited 29.04.2012) Available at http://journal-of-nuclear-physics.com