31 05 2021

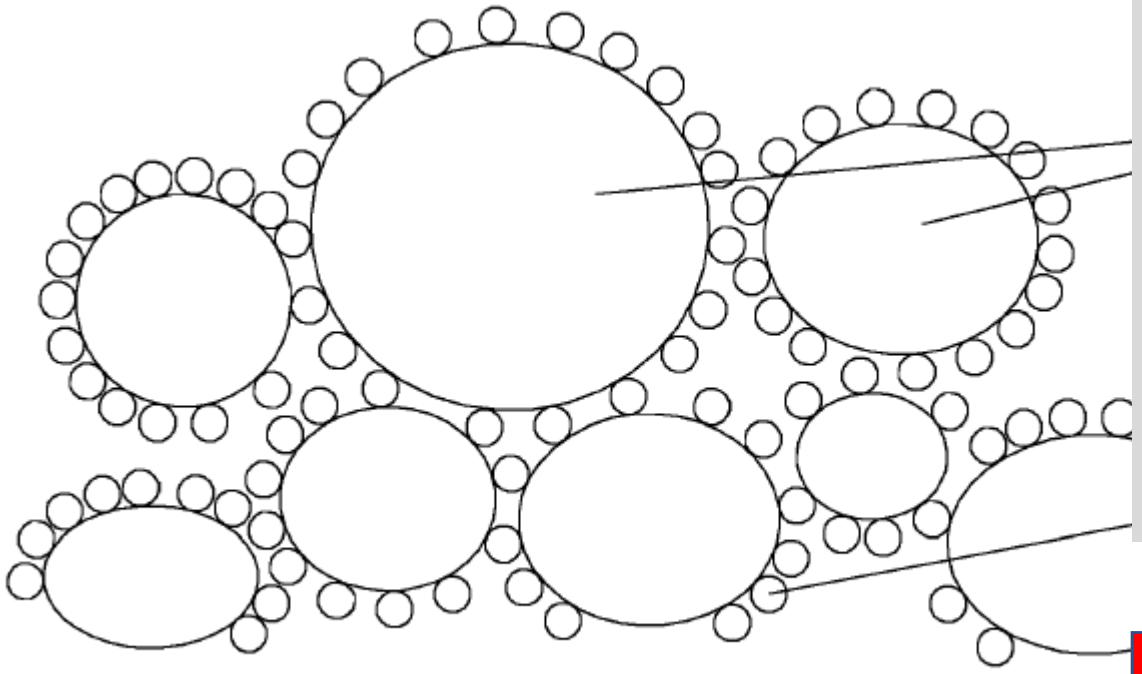
What was wrong since 1989 ?

An essay from David FOJT

French Independent Lenr Researcher

1st example of a great patent :

Here the Airbus patent
EP 3 070 050 A1



This example, however, did not support electron resonance as a theoretical explanation but rather condensed Rydberg matter.

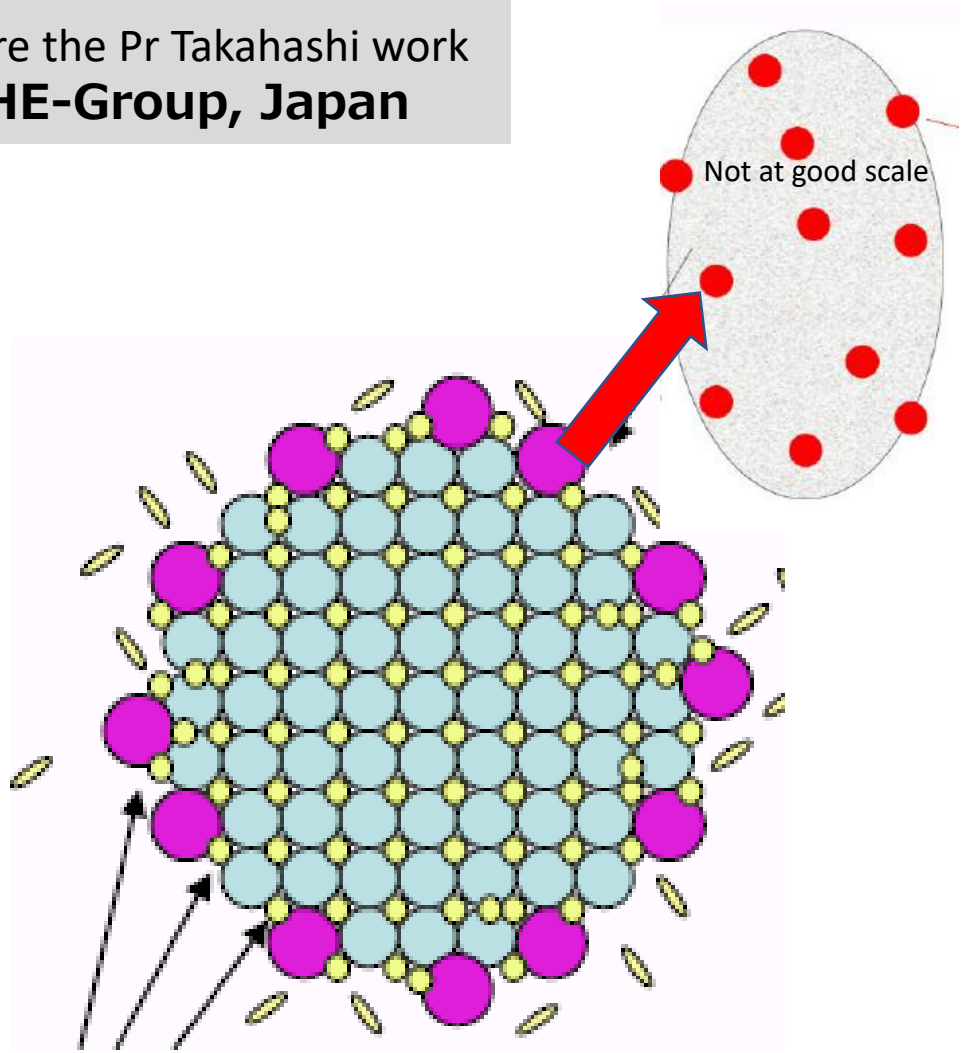
Airbus team used a plasma discharge at low pressure to create monoatomic H excited. The need of low pressure was used to avoid too quick H2 recombination during the carrying up to the catalyst.
Next the catalyst was a sponge of ZrO2 onto was deposited probably by electroless process a layer a Nickel.
This last was improved by surface doping to well stick H mono during their “landing”. As you can see on picture at left, the Airbus team created some open pores at different sizes which acted next as a funnel to condense the Rydberg matter. They involved the “Casimir force” in this way.

Very low hydrogen pressure

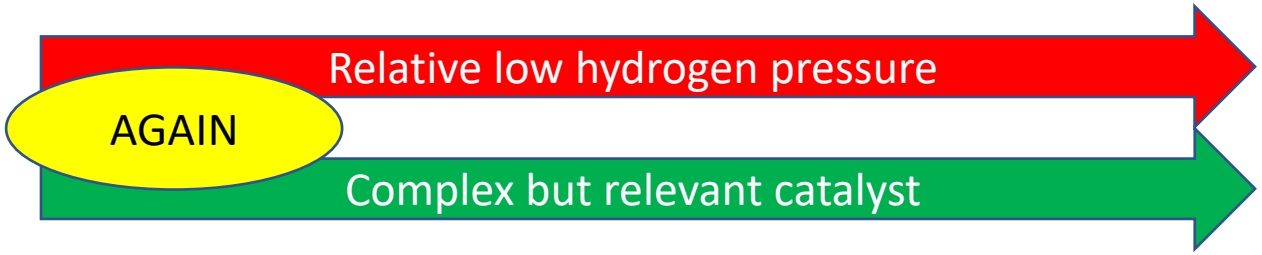
Complex and relevant catalyst

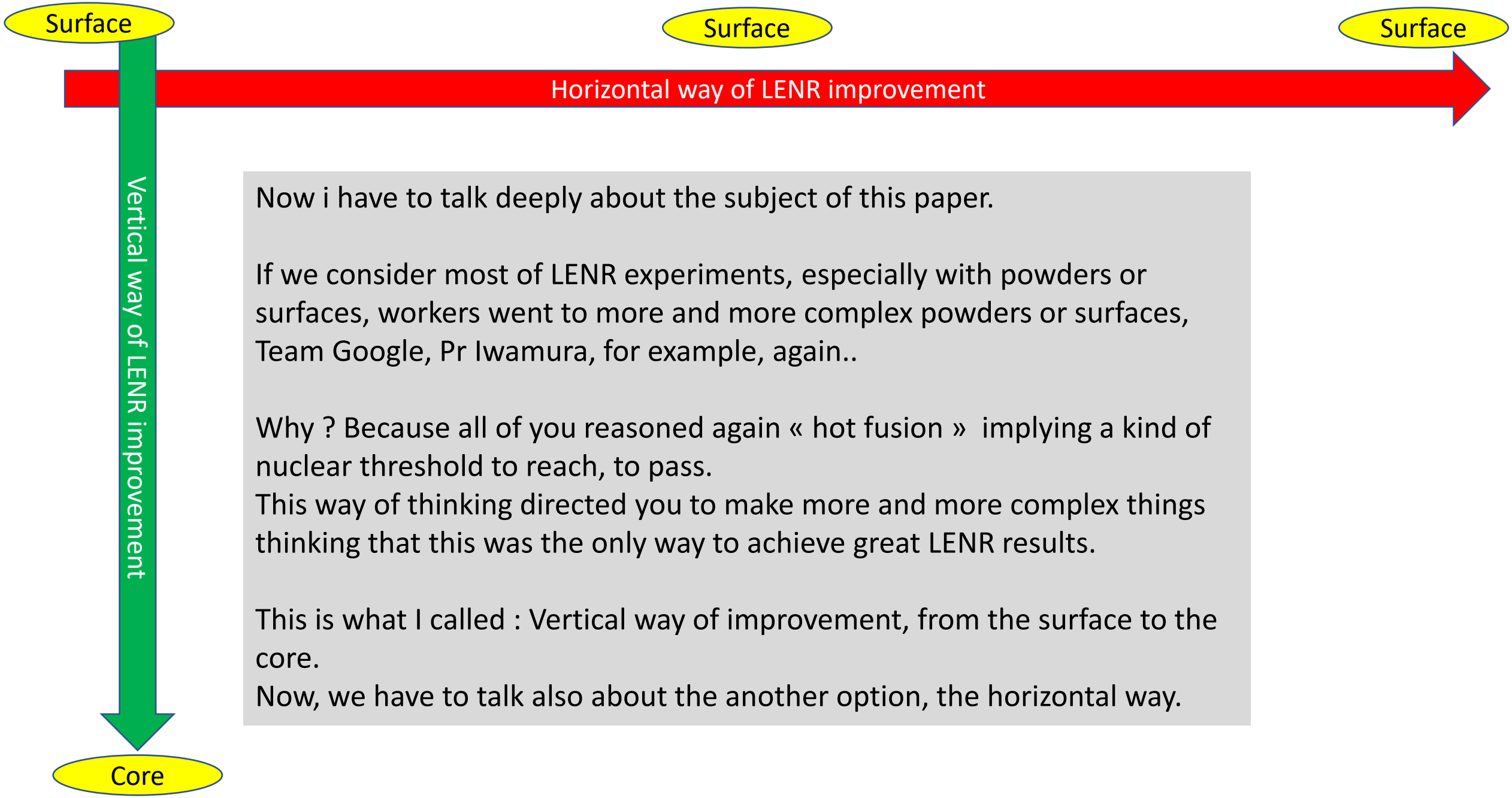
2nd example of an experiment:

Here the Pr Takahashi work
MHE-Group, Japan



This team have manufactured a complex nanopowder. They used a very fast heat treatment to induce a Nickel amorphous lattice. Then they added at particle surface a patchwork of Palladium atoms. These particles were supported next on bigger ceramic particles as we see at left on picture. The running expectation was that hydrogen or deuterium coming from external part will fill the entire particle core, next will flow back to overload areas close to the Pd atoms. The Lenr way involved here was the He4 product by 2D2. The pressure used reached 10 bar for absorption. This is several order of magnitude than the Airbus way because in this example no need to separate H2 into its monoatomic form expecting that a spillover effect will do that onto Pd atoms.





Now i have to talk deeply about the subject of this paper.

If we consider most of LENR experiments, especially with powders or surfaces, workers went to more and more complex powders or surfaces, Team Google, Pr Iwamura, for example, again..

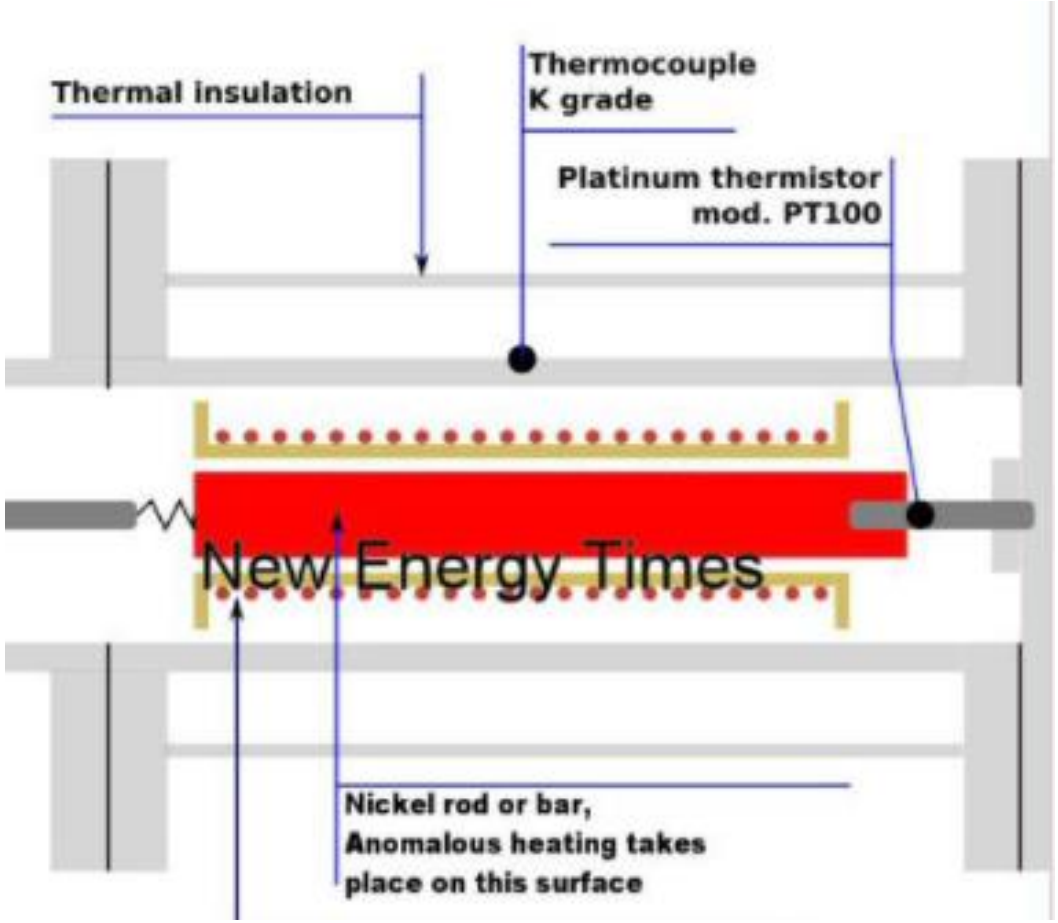
Why ? Because all of you reasoned again « hot fusion » implying a kind of nuclear threshold to reach, to pass.
This way of thinking directed you to make more and more complex things thinking that this was the only way to achieve great LENR results.

This is what I called : Vertical way of improvement, from the surface to the core.
Now, we have to talk also about the another option, the horizontal way.

3rd example of an experiment:

Here the Pr Piantelli work

Gaussian logic



A very simple device we can see here.
At the beginning during his 1989 discovery Pr Piantelli used only a simple Nickel rod heated under H2 a most of the time close to ambient pressure.
However he obtained sometimes very significant results.
He quickly considered the surface conditions as a way to justify his results.
Ball milled rods convinced him in this way.
However this was maybe only a happy coincidence, as an untreated surface also sometimes worked.

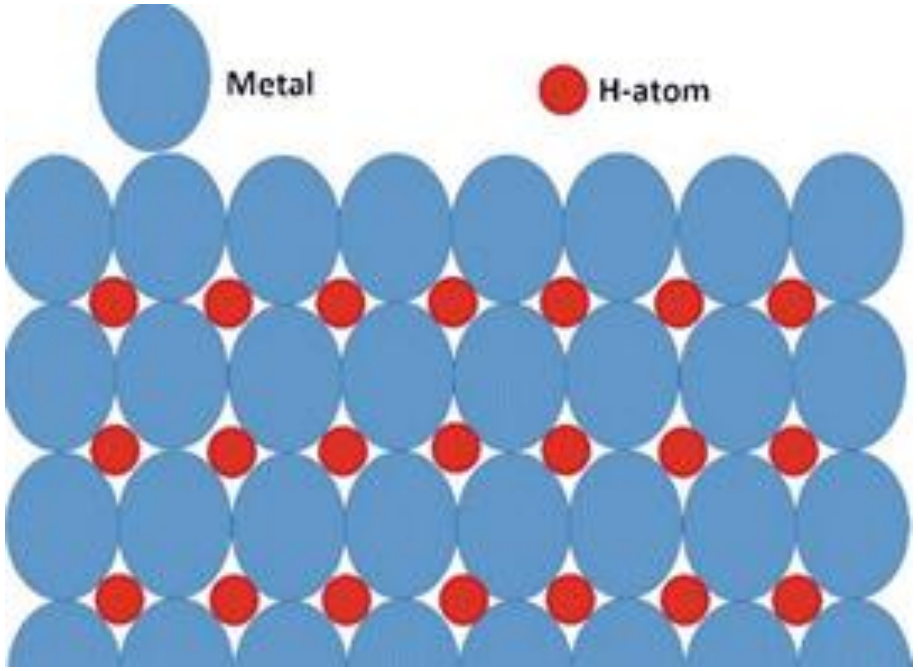
The fact that Lenr phenomenom could appear even without complex surface, involves that reasoning regarding the Hot fusion way of thinking is wrong !

Consequently, the pseudo nuclear threshold won't necessarily be improved only by a complex surface.

This is why the horizontal improvement inducted the use of powders, because LENR seems to follow a Gaussian logic rather than only passing a kind of threshold.

Palladium/Deuterium

Pons & Fleischmann **1989**



I would expect two-thirds of LENR papers available are talking again about this native experiment.

Quickly, we learned from McKubre the need for an almost 1/1 stoichometric ratio between the D2 and Pd atoms to see excess heat.

It remains unclear if H(D) atoms are bounded as hydrides or remain free inside the Pd, probably depending of the relative flux we can meet these both ways.
Which one is able to act as LENR ?

If we consider that H(D) and the Pd lattice aren't bounded during LENR triggering, that means only a flat surface with the same stoichometry should work too !?

If we consider that H(D) and the Pd lattice aren't bounded during LENR triggering, that means only a flat surface with the same stoichometry could work too !?

Piantelli experiment : 2 bar 300°C : MFP 150 nm

Takahashi experiment : 10 bar 300°C : MFP 30 nm

Andrea Rossi minimum prerequisite
to start seeing his effect : 200 bar 500°C : MFP 2 nm !!

Now if we consider a flat Nickel surface with around 300 pm between each atom, we will have :

For Piantelli: (150x10.3 pm / 300 pm)exp 2 = 250 000
That means that only one H(D) can react with 250 000 nickel atoms !
For Takahashi : We will have in his case 10 000
For Rossi : - - - only 44 !!

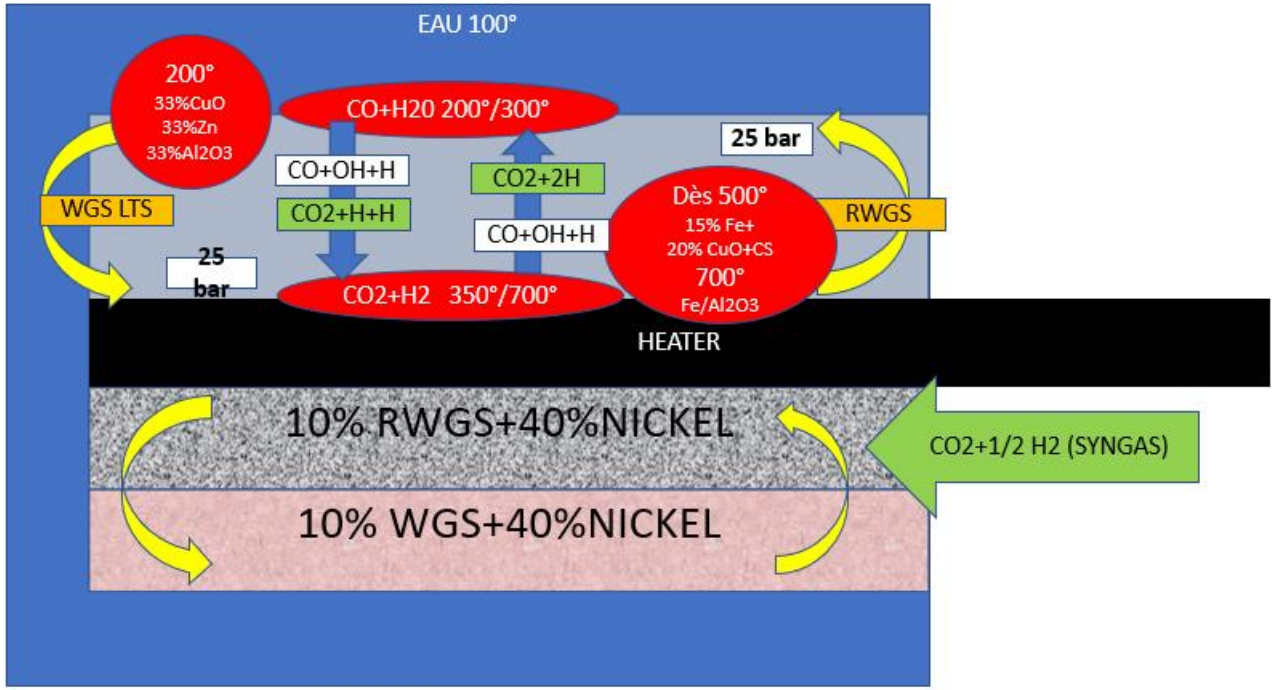
We can see this relation isn't linear at all , more the pressure will be high, more small will be the rate between H(D) vs surface atoms.

The MAIN FREE PATH of gas molecules represents the average distance travelled by a moving particle. Quickly that means the molecule concentration VS volume. Below a quick calculator I often used: https://www.omnicalculator.com/physics/mean-free-path

According to these calculations we should use a trick to reach a close prerequisite as McKubre 1/1 between H(D) vs Nickel.

Rossi said to have used the electrolysis way to produce directly Hydrogen, that didn't mean filling the reactor but rather using a nickel sintered porous cathode to fill it directly avoiding single H carrying.

We must product directly against the nickel surface an high rate of monoatomic hydrogen.



Focardi said : the function of the catalyst was to transform the hydrogen from normal, or diatomic, into monoatomic, so that it could penetrate into the metal lattice of nickel.

That doesn't mean at all that Nickel acts as a spillover catalyst to break each H2 molecules into an atomic form !

In this way, i imagined a double Water Shift both with another reverse water shift catalyst to produce directly and continually against the nickel powder surface enough H monoatomic. This looping principle driven by the temperature gap between water vs heater could do what we need.

Unfortunately this way will run until a general fusion because it has no brake.

The famous catalyst : The Iron Steam Reaction

Redox reaction : pure iron + H2O ⟺ iron oxides + H2.

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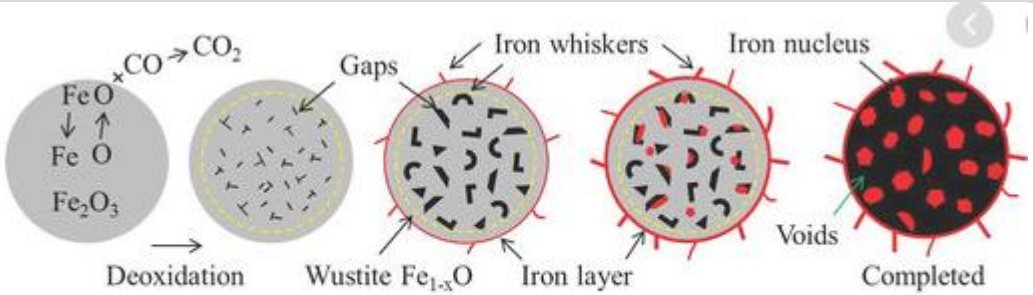
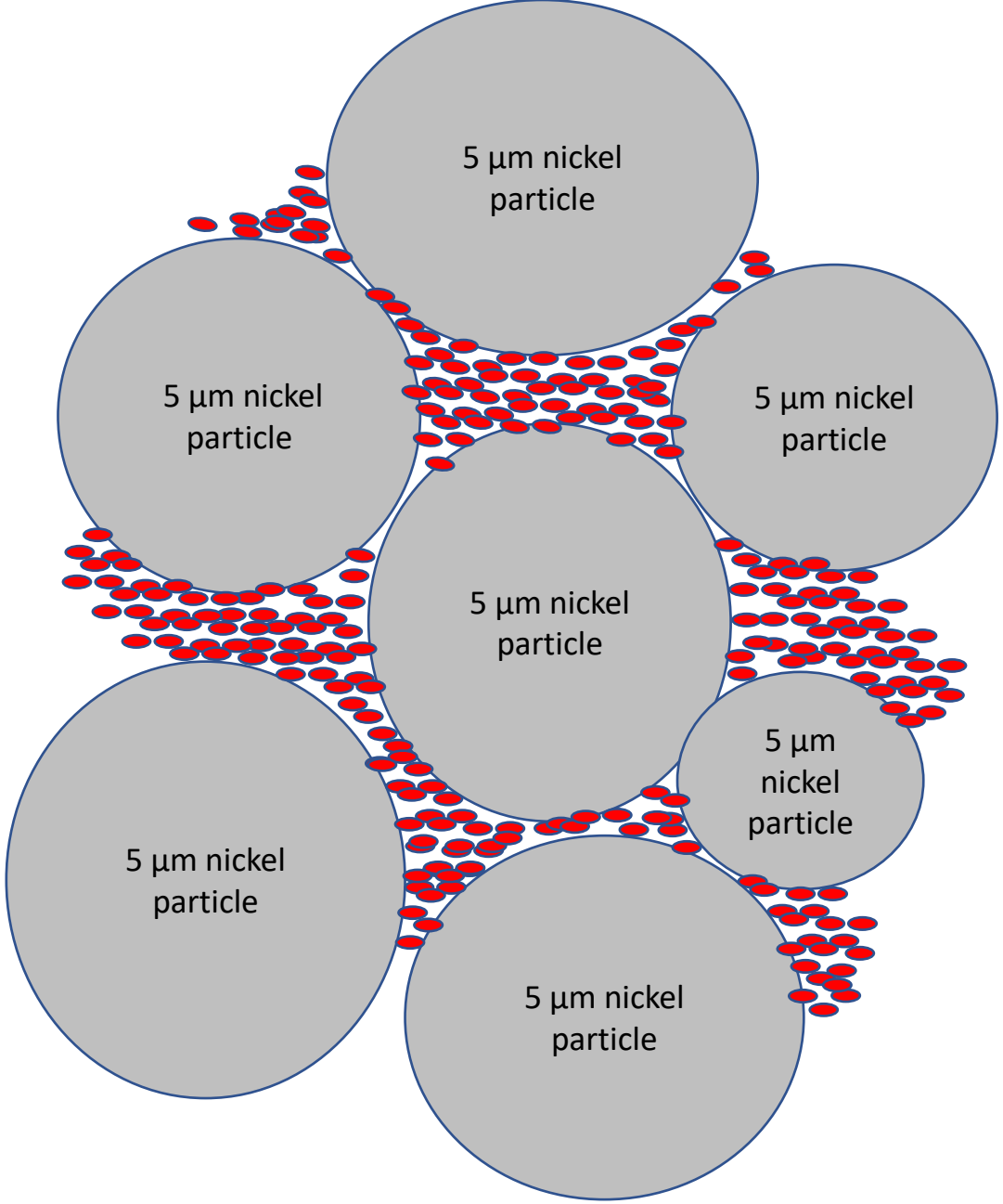
Single H is directly « created » onto the nickel particle by metal oxidized under steam. It produces **highly excited monoatomic H** which next are carried by spillover effect between iron to nickel, for example, by some whiskers a kind of gate in fact.



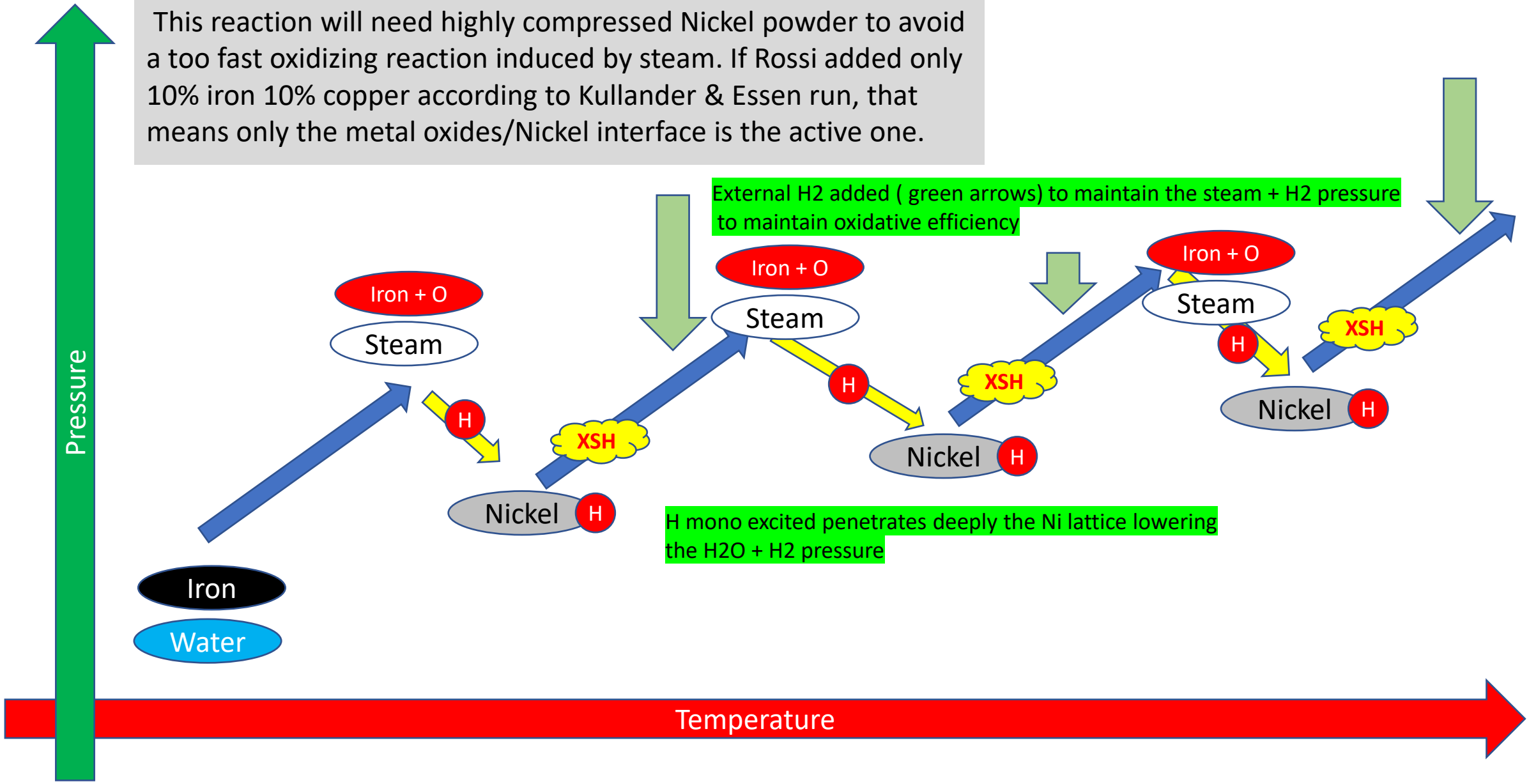
Schematic diagram of the evolution process of a single particle reduction.



500nm metal oxides (iron, copper, others)

The famous catalyst : The Iron Steam Reaction

This reaction will need highly compressed Nickel powder to avoid a too fast oxidizing reaction induced by steam. If Rossi added only 10% iron 10% copper according to Kullander & Essen run, that means only the metal oxides/Nickel interface is the active one.



Surface

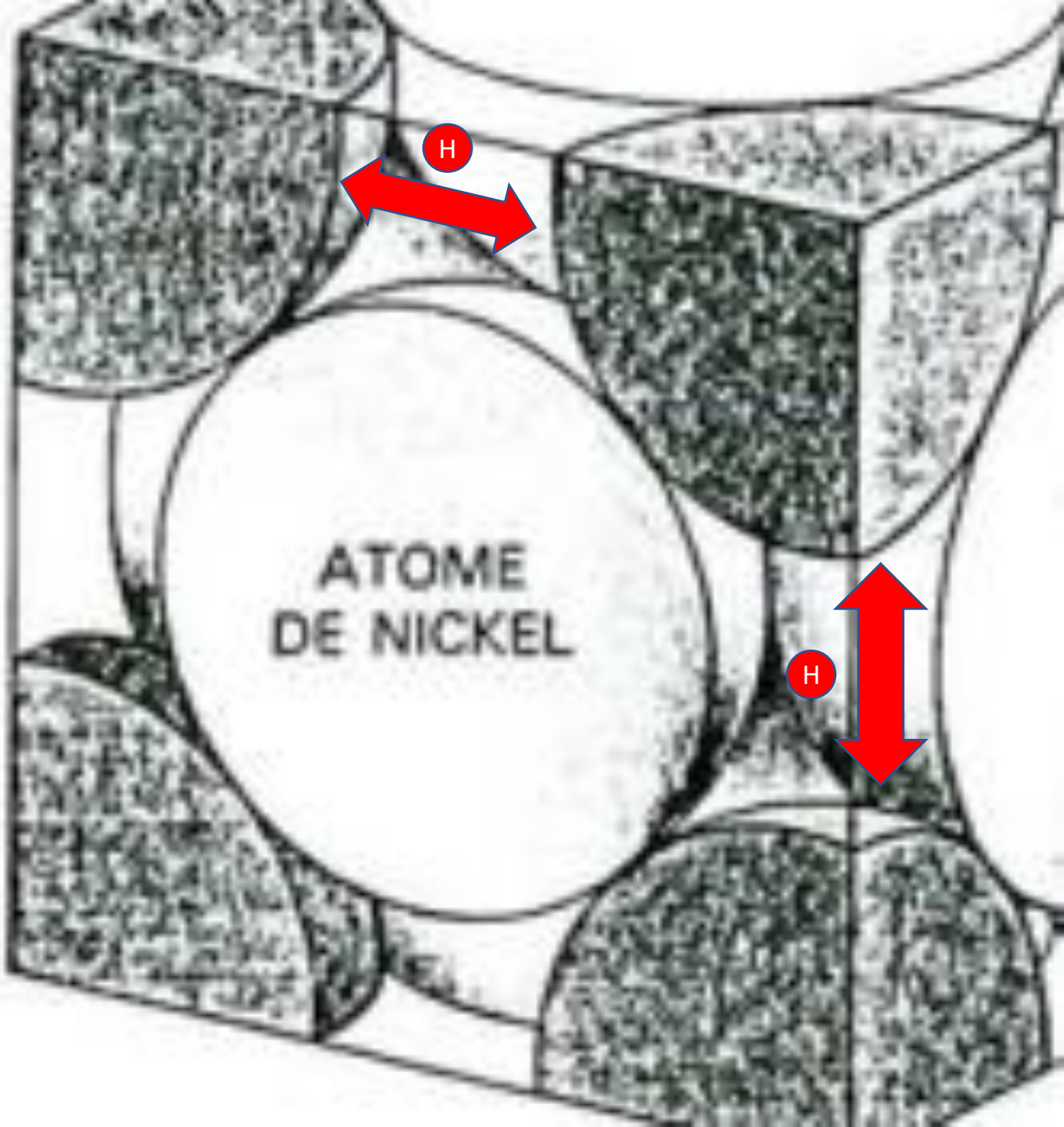
Vertical way of LENR improvement

Core

Now we have fully understood that Lenr follows a Gaussian logic, we can then improve the local Lenr environnement as well.

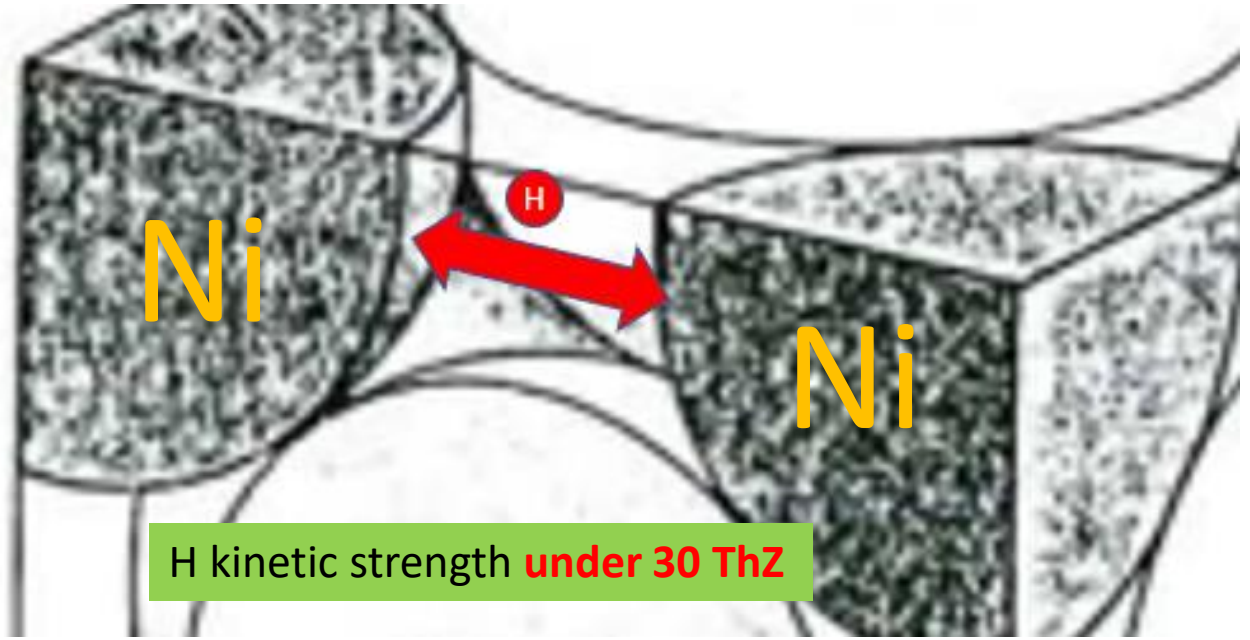
Dr Rossi said : The atoms The nuclei of hydrogen, the high adsorption capacity of nickel towards them, they compress around the nuclei of atoms of metal; the high temperature causes **internuclear percussion**, which triggers the activation areas in its vicinity

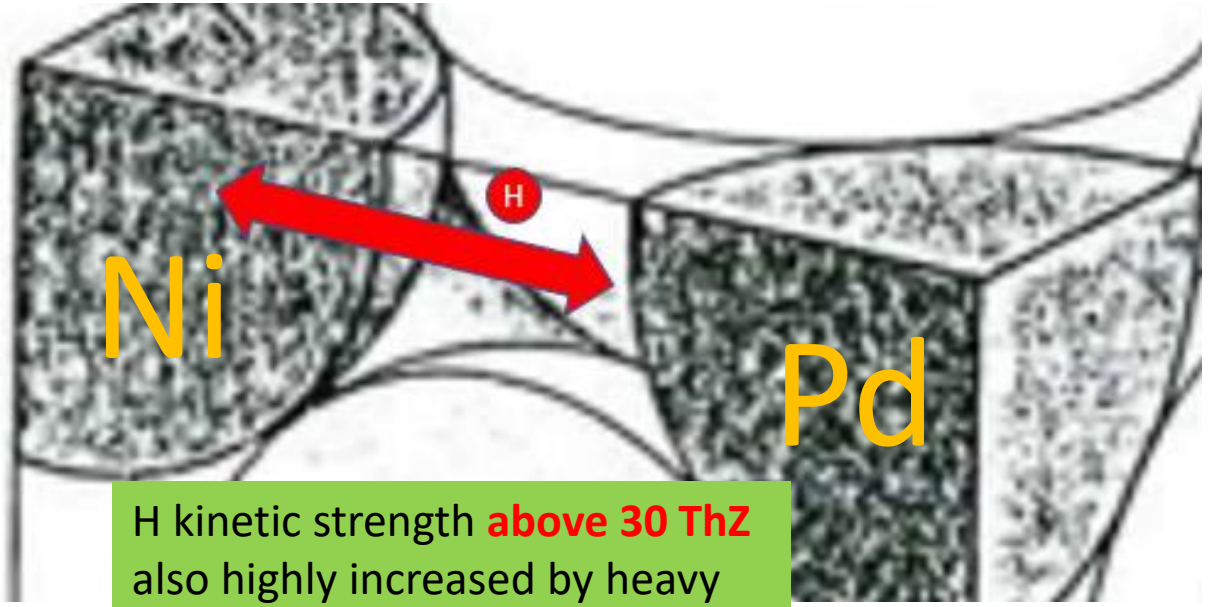
Here we understood that phonons are involved according to Pr Hagelstein thoughts. However discretes breathers involved by Pr Dubinko, are also relevants. They are a kind of phonons at higher harmonic states.



Pr Hagelstein well explained how phonons could behave in the Lenr case.
Now, regarding Lenr, the main thing we have to consider is that phonons possess a maximum frequency between 10 to 30 Thz.
30 Thz means only 240°C when we know that Lenr experiments already climbed at very higher temperatures !

In this case , how should behave thermal waves at higher frequencies than phonons ?
In fact, if they can't catch an higher frequency, the thermal energy will be stored by a wave amplitude increased … This is what Pr Dubinsko called « discrete breathers » which are powerfull harmonic waves.
As he explained the H kinetic energy could be increased even at lower temperature (inside phonons area) by diffusing inside the nickel lattice another heavier atoms as Pt or Pd to induce a resonance which tend to move the H nucleus to the ligher metal atom (Nickel).
Pd or Pt as their layers are fully filled by electrons won't react with H in their case.





SYNTHESIS

- We learned that heavier Pd or Pt atoms diffused at nickel particle surface will increase the H kinetic strength.
- It will be enough to bring closer Hydrogen and Nickel nuclei then the tunnel effect will do the job according to Dr Meulenberg expectations.
- The Nickel surface lattice needs to be loaded at high rate, the more close to 1/1 H/Ni, helped by a chemical way induced by the iron/steam process.
- Monoatomic hydrogen produced by this way are highly excited (if your compare with a membrane diffusion), enough to facilitate the « reaction » with Nickel.
- These explanations are the Rossi's starting point of his technology.
- Next he improved this way by using, for example, the H diffusion across a SS tube to go deeper in the iron oxidizing process.
- Next again, he used a new way to dissociate molecules at Lugano, a technical way acting as a starting point for his next plasma releases.
- This paper also highlights the underestimation of the H mono carrying problem by all teams.

CONCLUSION

- Dear scientists involved in the Lenr field, as you understood, this paper wasn't written like all the others that you are used to reading or writing.
- I shared this paper only with the great researchers who gone in a similar way of thinking like me, around « electron vibrations » inducted in the metal lattice.
- I shared also this paper with people highly involved by their laboratory work.
- This paper highlighted that Lenr phenomenom behaves according to a Gaussian rule rather than thinking by classic nuclear reflexes.
- Next rather than using so many boring « intergalactic mathematical formulas », we first have to consider the metal lattice shape only as a compound of springs and simple balls.
- By this way we are able to better understand how things could behave, how we could highly improve some hydrogen « impact » strength only by playing with a gap between relative masses of atoms.
- Now, we don't forget the main thing to respect is reaching the more close rate between monoatomic hydrogen supplied and surface atoms.
- I sent this paper to members from China, USA, UK, EU, Russia and Japan, i think some of you will become more pragmatic to take the lead.

Thank you for watching

David FOJT