I. "Обзор результатов ICCF 26", докладчик: к.т.н. Владислав Анатольевич Жигалов, Satbayev University, г. Алматы, Казахстан, zhigalov@gmail.com.

II. "Что нового и важного в трудах конференции ICCF 26????", докладчик: д.ф.-м.н. Анатолий Иванович Климов, в.н.с. ОИВТ РАН, Москва, klimov.anatoly@gmail.com, sb87-2-12-1.pdf - тезисы, sb87-2-12.pdf - доклады, sb87-2-12di.pdf - доп. инфо., чат - txt, видео 25.06.25.

I. О конференции ICCF-26

Владислав Анатольевич Жигалов

Satbayev University

Эпиграф

Вот одна из тех историй
О которых люди спорят
И не день и два, а много лет
Началась она так просто
Не с ответов, а с вопросов
До сих пор на них ответов нет

г. Мориока
26-30 мая 2025


Morioka, Iwate, Japan
ICCF 26
The 26th International Conference
on Condensed Matter Nuclear Science
26-30 May Aiina, Morioka, Japan
Group Photo @ 4F / Aiina , 2025.5.26(mon)
Photo by Satomi Fujisaki (LOC /Iwate-Univ.)


次演者席

Shinya Narita. Opening

1990	Salt Lake City, Utah, U.S.
1991	Como, Italy
1992	Nagoya, Japan
1993	Lahaina, Maui, U.S.
1995	Monte Carlo, Monaco
1996	Hokkaido, Japan
1998	Vancouver, Canada
2000	Lerici (La Spezia), Italy
2002	Beijing, China
2003	Cambridge, Massachusetts, U.S.
2004	Marseille, France
2005	Yokohama, Japan
2007	Sochi, Russia
2008	Washington DC, U.S.
2009	Rome, Italy
2011	Chennai, India
2012	Daejeon, South Korea
2013	Columbia, Missouri, U.S.
2015	Padua, Italy
2016	Sendai, Miyagi, Japan
2018	Fort Collins, CO, U.S.
2019	Assisi, Italy
2021	Xiamen University, Fujian, China
2022	Mountain View, CA, U.S.
2023	Szczecin, Poland

ICCF20

ICCF returns to Japan

– 130 in person

– 30 virtually

Доклады по странам

США	24
Япония	13
Китай	7
Индия	6
Англия	4
Италия	4
Казахстан	4
Швейцария	3
Франция	2
Украина	2
Германия	2
Россия	2
Польша	1
Тайвань	1
Португалия	1
Словения	1
Канада	1
Австралия	1
Нидерланды	1
Венгрия	1
Всего	**81**

LENR =

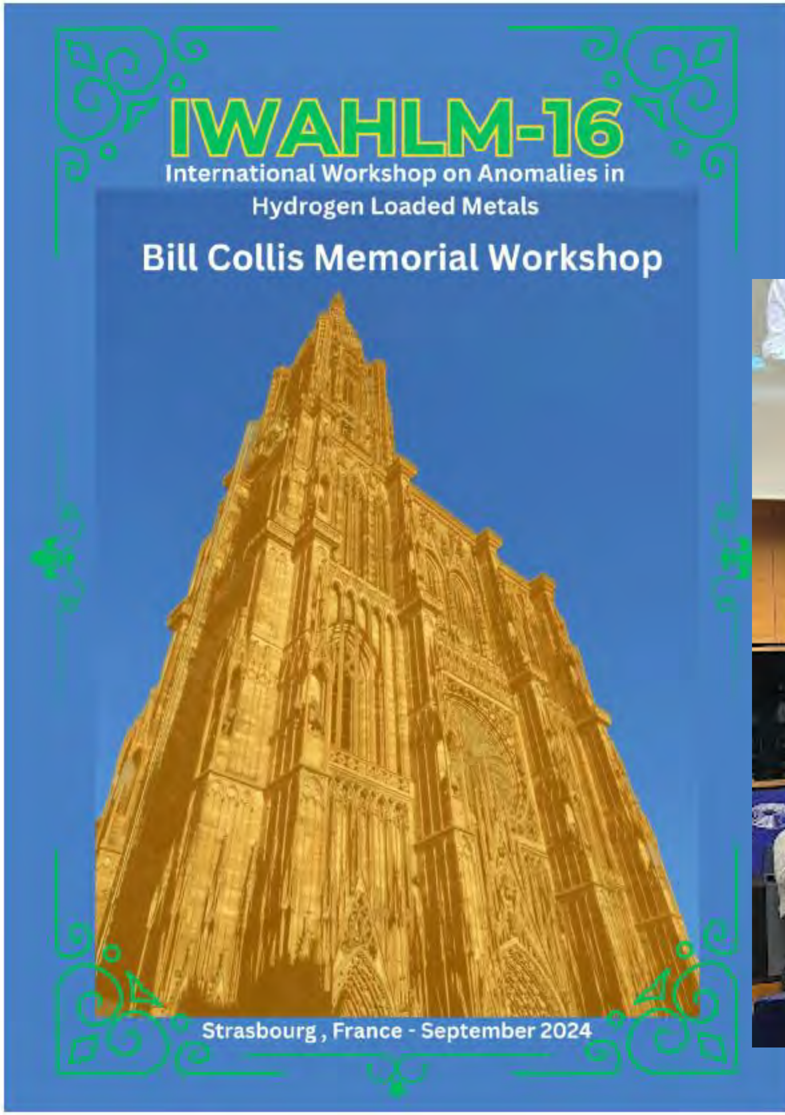
- Low Energy Nuclear Reactions
- Низкоэнергетические ядерные реакции
- Холодный ядерный синтез
- Трансмутация химических элементов
- Холодная трансмутация ядер
- Condensed Matter Nuclear Science

CF vs. LENR

- **Cold Fusion**: ограничен рассмотрением поведения D(H) в кристаллической решетке металлов:
  - Поиск нейтронов, He, T, гамма
  - Поиск механизмов D+D реакций

$$D + D \rightarrow T + p + 4{,}0 \text{ МэВ}$$
$$D + D \rightarrow {}^{3}He + n + 3{,}25 \text{ МэВ}$$

- **LENR**: более широкое рассмотрение
  - Трансмутация элементов
  - Реакции без водорода
  - Плазменные реакции
  - Биологическая трансмутация элементов
  - Странное излучение и др.

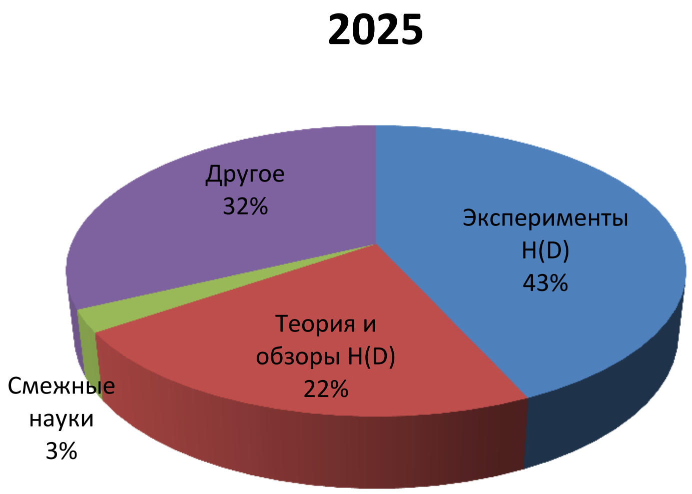


5 September 2024

New Path from Green Hydrogen to Green Energy

Conference at the European Parliament

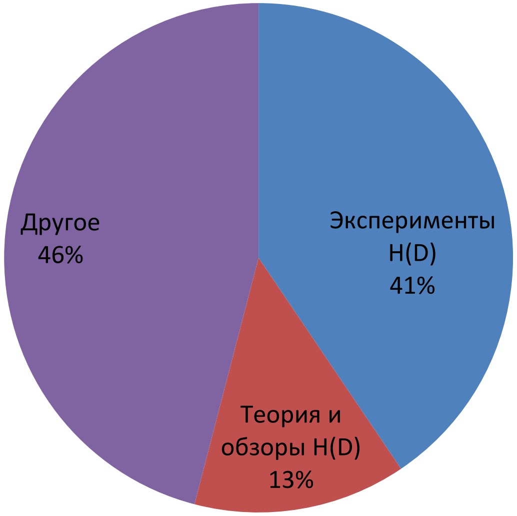
Темы докладов



Устные/постеры (ICCF-26)

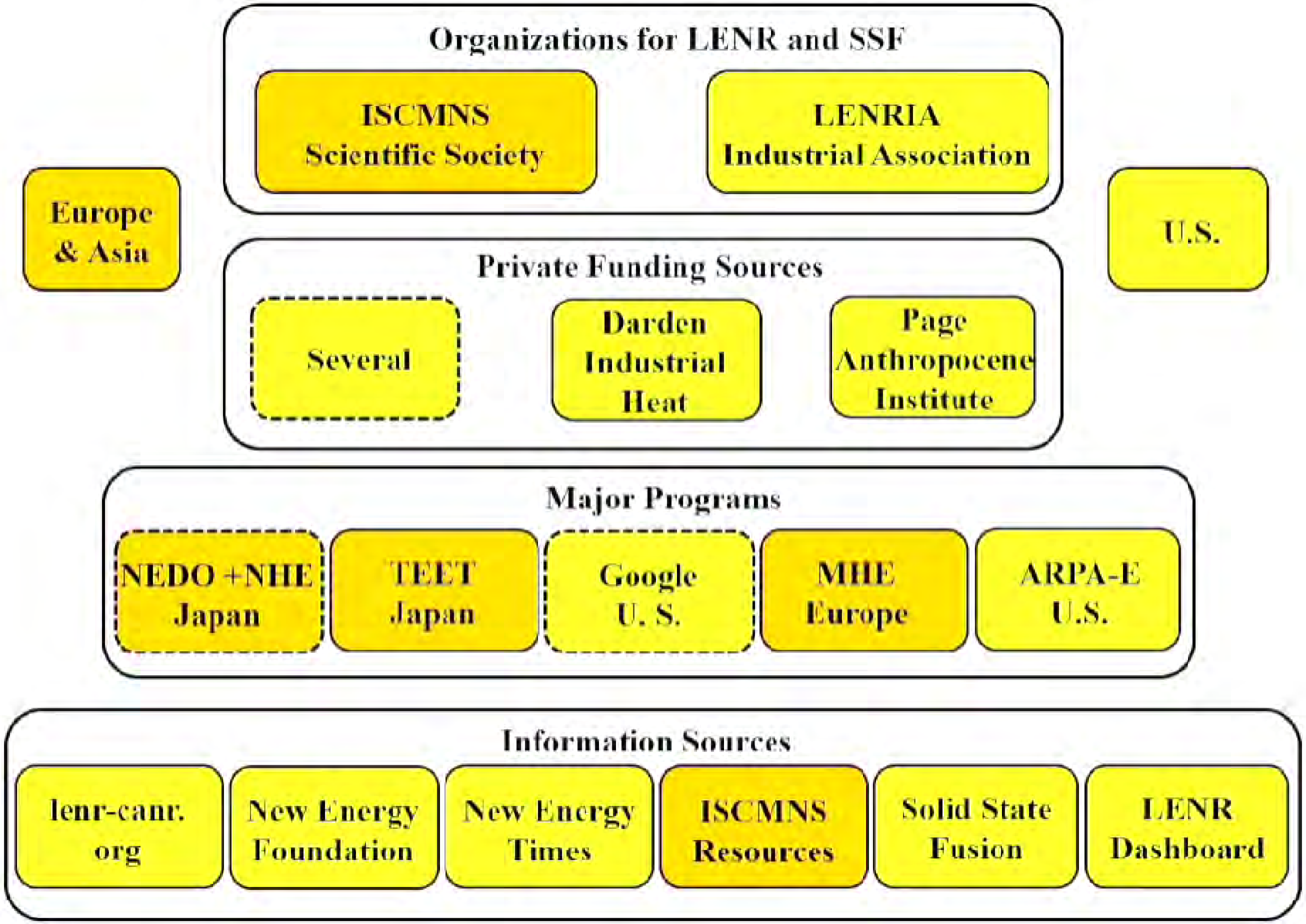
Устные доклады (44)

Постеры (37)



David Nagel

David Nagel. Overview of LENR Science and Business in the United States



David Nagel. Overview of LENR Science and Business in the United States

LENR Companies

Clean Planet
Japan

ENG8
Portugal

HYLENR
India

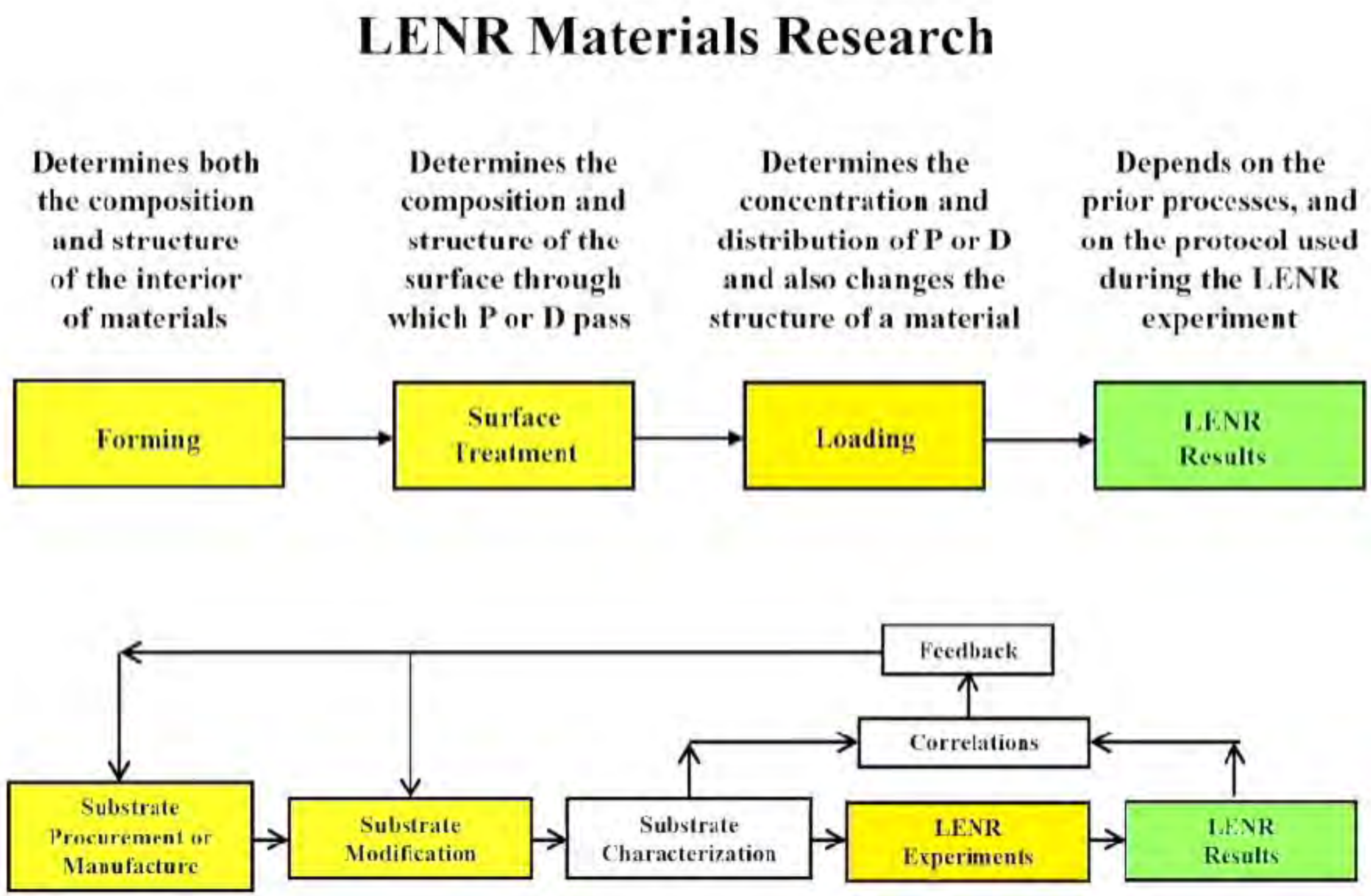
AQUATERRA FUSION
Thailand

METATRON N.R.G. Ltd.
Israel

Brillouin Energy
USA

E-Cat The New Fire
Leonardo Corporation
USA

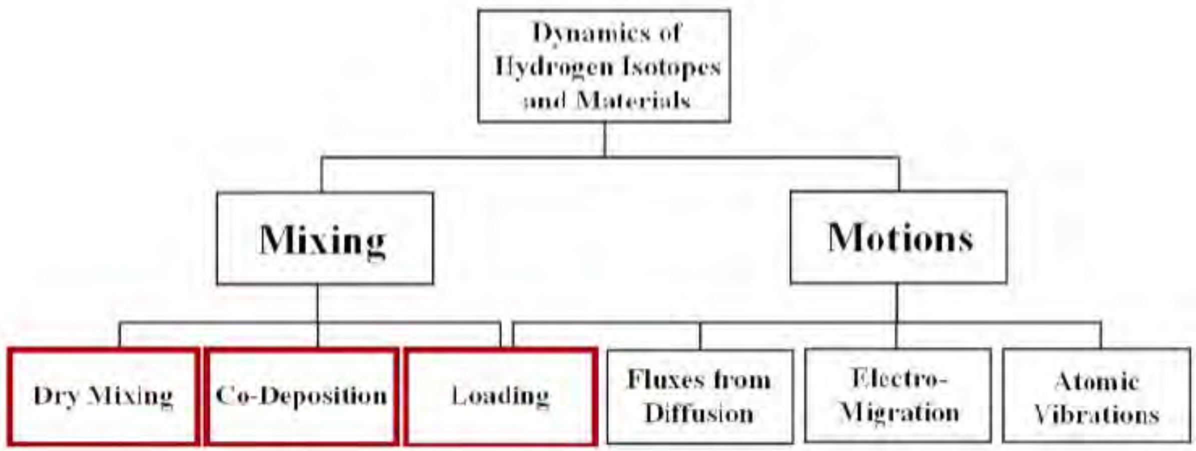
David Nagel. Overview of LENR Science and Business in the United States



David Nagel. Overview of LENR Science and Business in the United States

Production of LENR Materials

Materials for LENR experiments have been obtained in three ways:
In one, some materials are procured and possibly modified prior to **loading** of protons or deuterons into them.
In the second method, called **co-deposition**, the materials and hydrogen isotopes are simultaneously electrochemically deposited on a substrate.
The third method involves **dry mixing** of the materials prior to operation.



Diffusion is good (protons and deuterons) and maybe bad (metal atoms).

Yasuhiro Iwamura. Current Status of Research and Development of Condensed Matter Nuclear Science in Japan

Contents

1 Past Research (1989-2015) in Japan
- 1.1 Electrolysis experiments in the early days
- 1.2 NHE (New Hydrogen Energy) project (1993-1998)
- 1.3 Hybrid experiments of electrolysis and gas loading
- 1.4 Gas loading Experiments
- 1.5 Beam Experiments
- 1.6 Japan CF-Research Society (1999-)

2 Current research (2015-) in Japan
- 2.1 NEDO project (2015-2017)
- 2.2 Current Research Participating Organizations (universities and companies) in Japan
- 2.3 Overview of university research
- 2.4 TEET project (2023-2026)

3 Challenges and directions of future research

Yasuhiro Iwamura. Current Status of Research and Development of Condensed Matter Nuclear Science in Japan

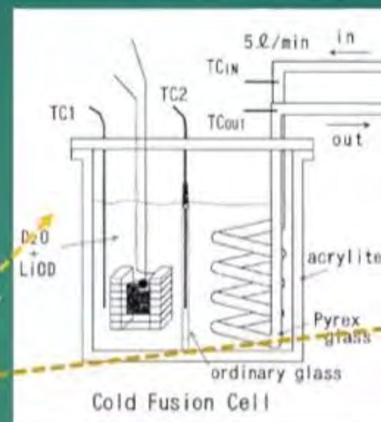
1.1 Electrolysis experiments in Japan in the early days

Various types of experiments had been conducted since just after the F&P announcements.

D_2O electrolysis : D-Pd system
F&P type

Excess heat, Neutron emission, Transmutation

Takahashi et al., Proc. of ICCF3 (1992).
T. Mizuno, T. Ohmori and M. Enyo,. J. New Energy, 1(2): 37 (1996).



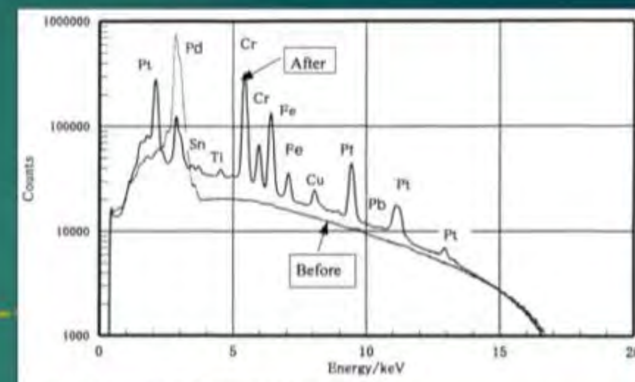


Fig. 1. EDX spectra from the Pd rod before and after the electrolysis.

H_2O electrolysis : H-Ni, Au system

Excess heat, Transmutation

T. Ohmori and M. Enyo, Proc. of ICCF3(1992)
R. Notoya et al., Fusion Technology., 24: 202-204(1993)
T. Ohmori, M. Enyo, T. Mizuno et.al, Fusion Technology, 33:3, 367-382 (1998)

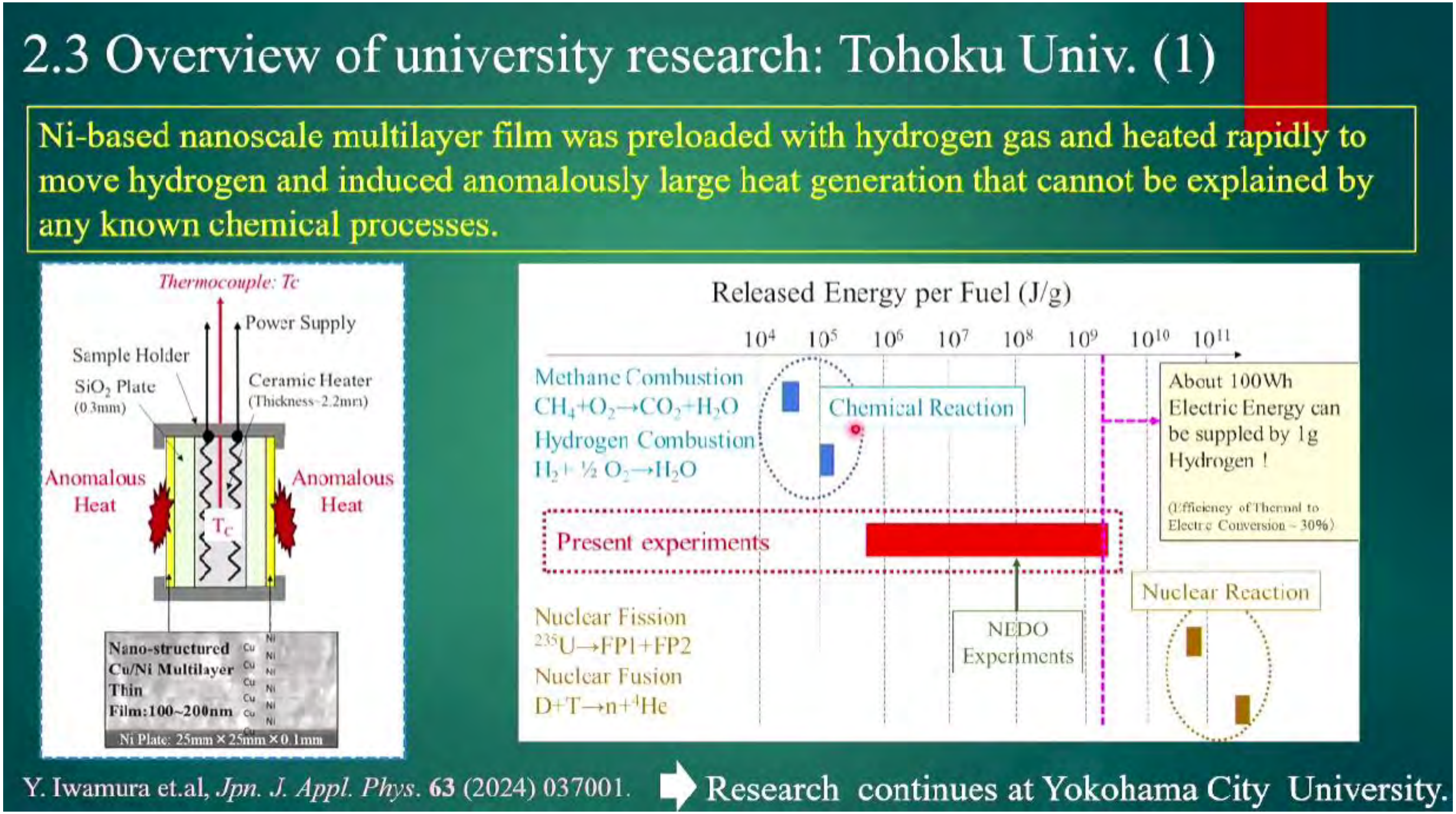
TABLE II

Isotopic Contents of Fe Produced in Various Electrolysis Systems

Sample	Total Ion Intensity (count)	Isotopic Content (%)		
		^{54}Fe	^{56}Fe	^{57}Fe
1	17 205	3.2	74.7	22.0
2	619 950	5.6	84.7	9.6
3	192 134	3.7	67.4	28.9
4	1 254 164	7.0	67.6	25.3
5	141 211	6.6	84.1	9.2
Natural value		5.82	91.66	2.19

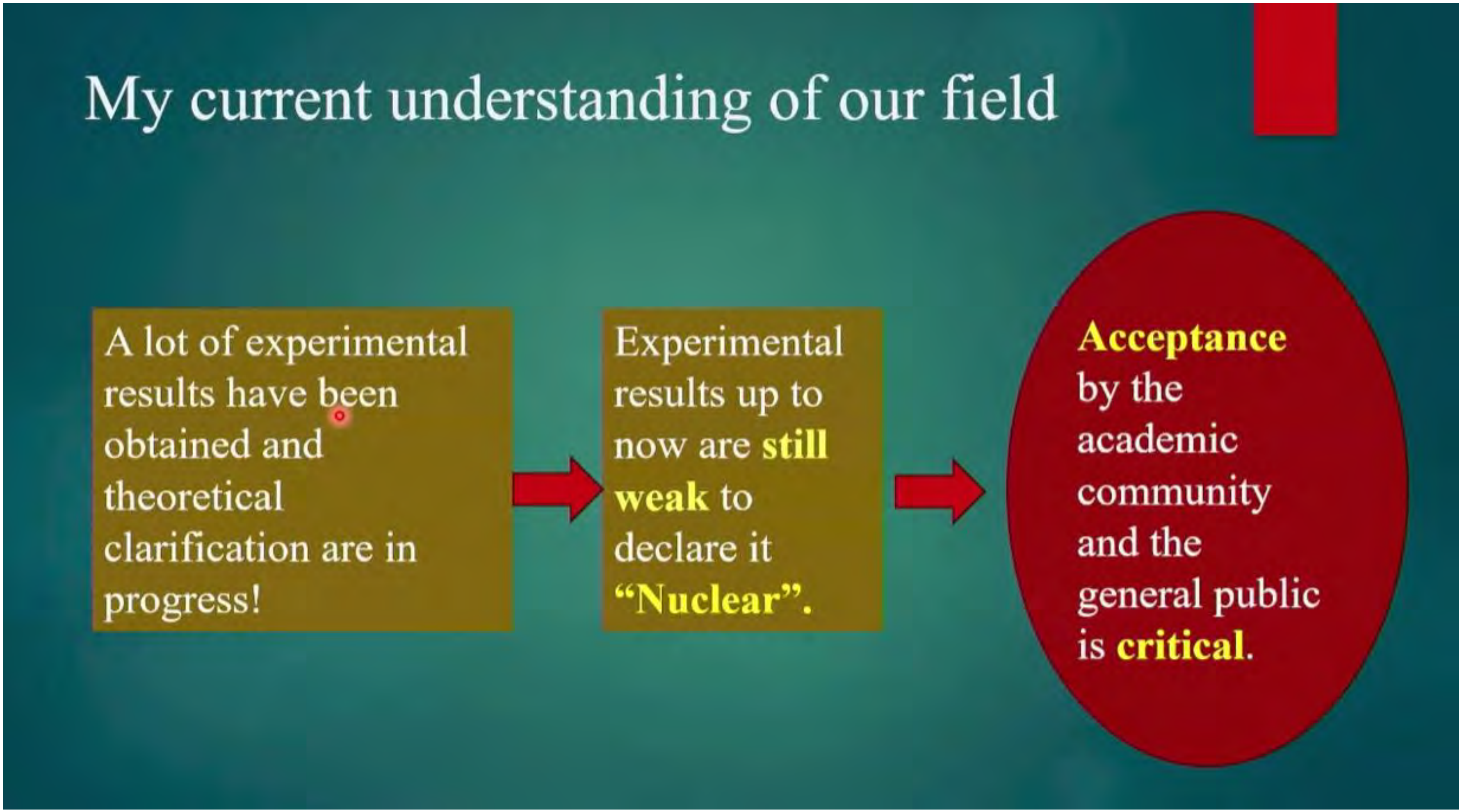
Yasuhiro Iwamura. Current Status of Research and Development of Condensed Matter Nuclear Science in Japan

Yasuhiro Iwamura. Current Status of Research and Development of Condensed Matter Nuclear Science in Japan

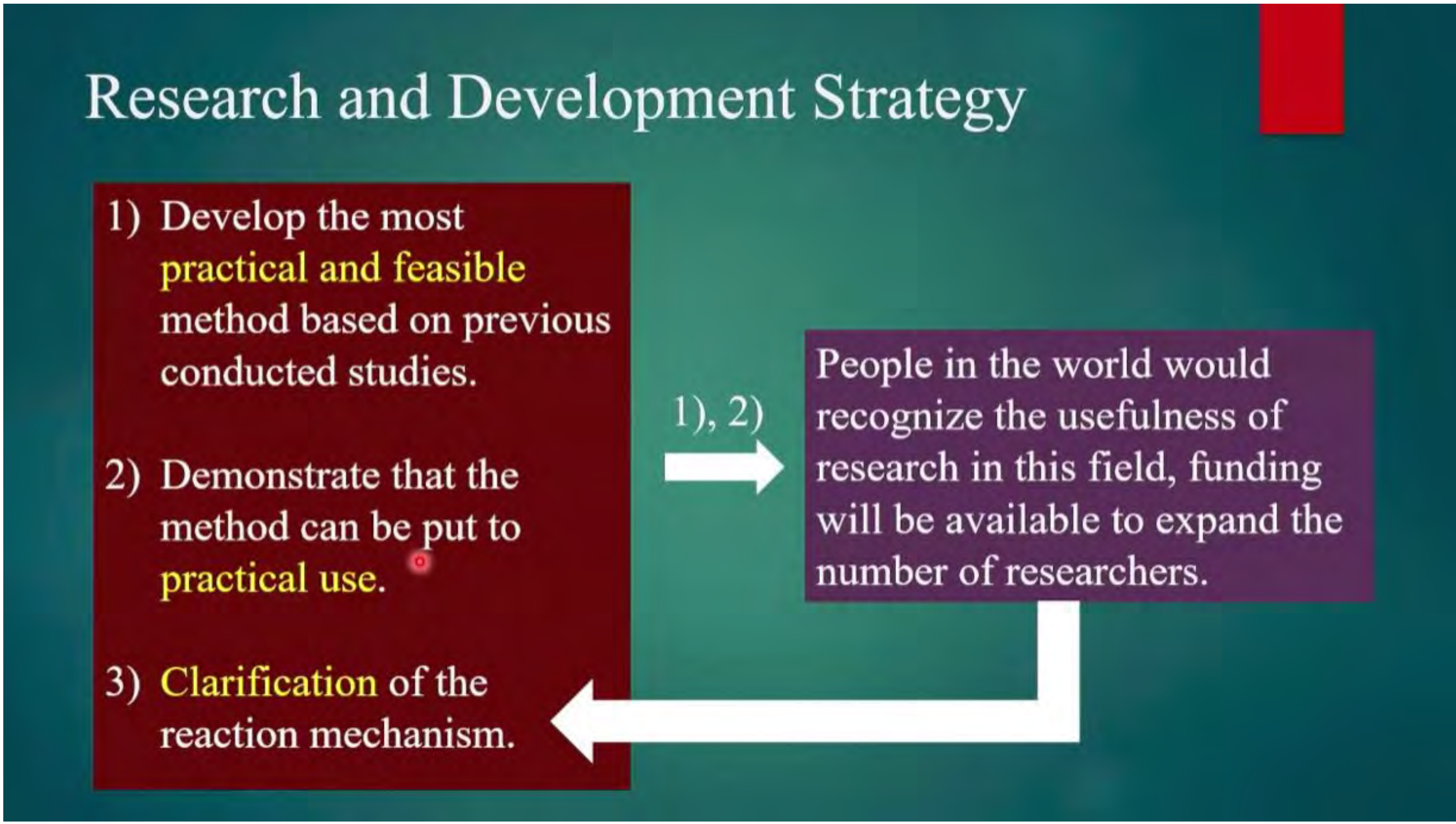


Yasuhiro Iwamura. Current Status of Research and Development of Condensed Matter Nuclear Science in Japan

Yasuhiro Iwamura. Current Status of Research and Development of Condensed Matter Nuclear Science in Japan



Yasuhiro Iwamura. Current Status of Research and Development of Condensed Matter Nuclear Science in Japan



Konrad Czerski. Results of the European CleanHME Project

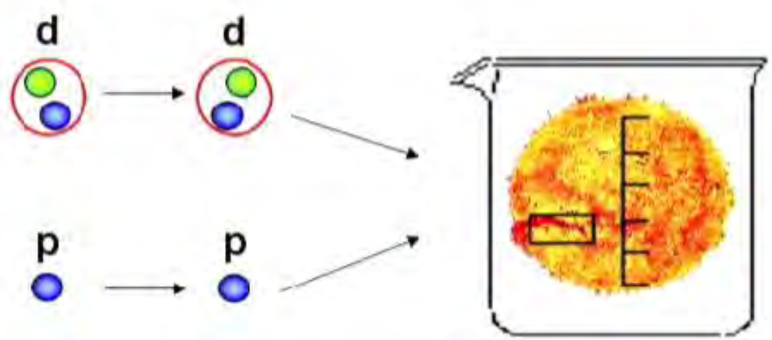
CLEAN HME

EUROPEAN UNION

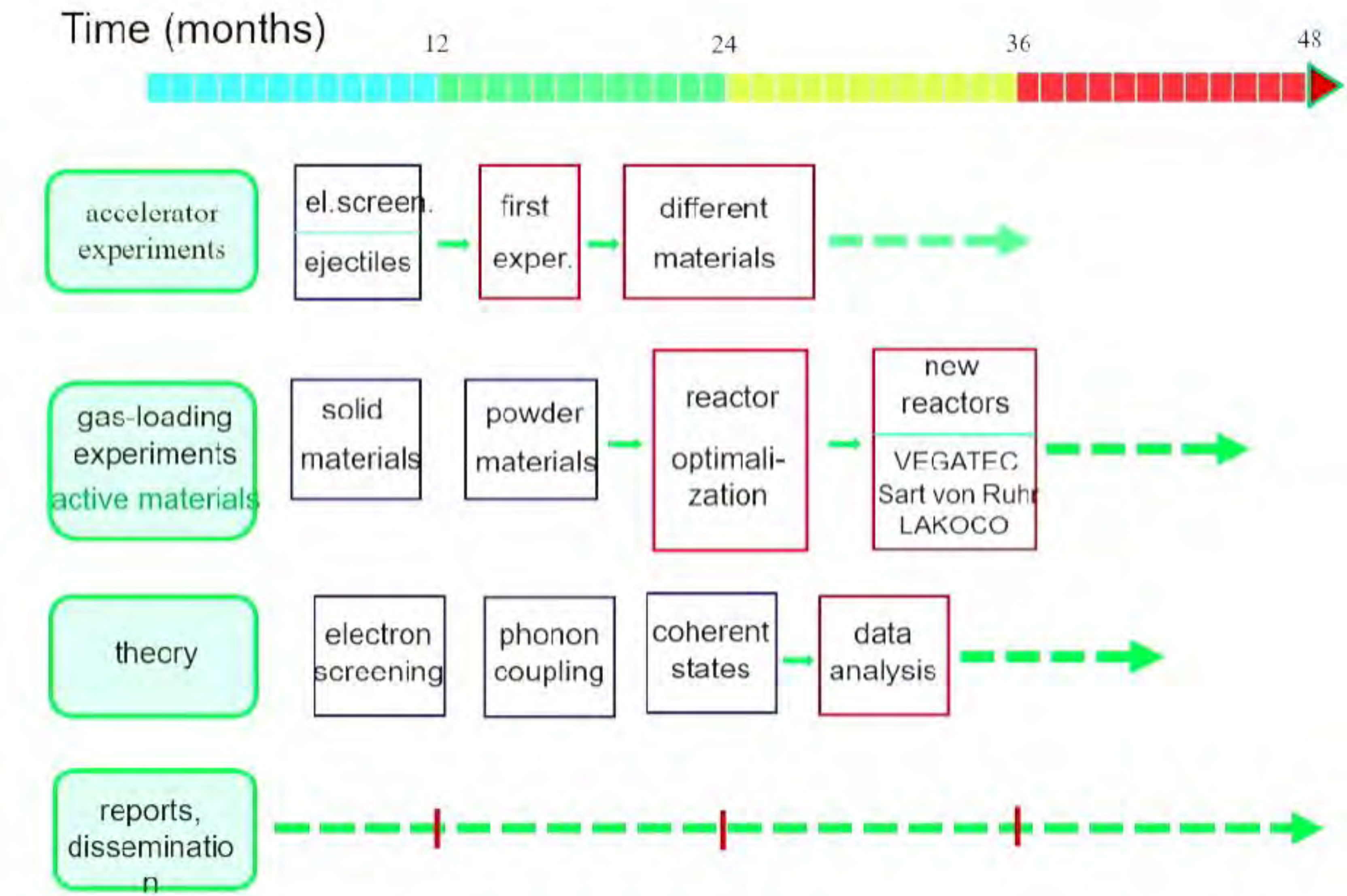
Results of the European CleanHME Project

01/08/2023 – 31/01/2025

for CleanHME Consortium



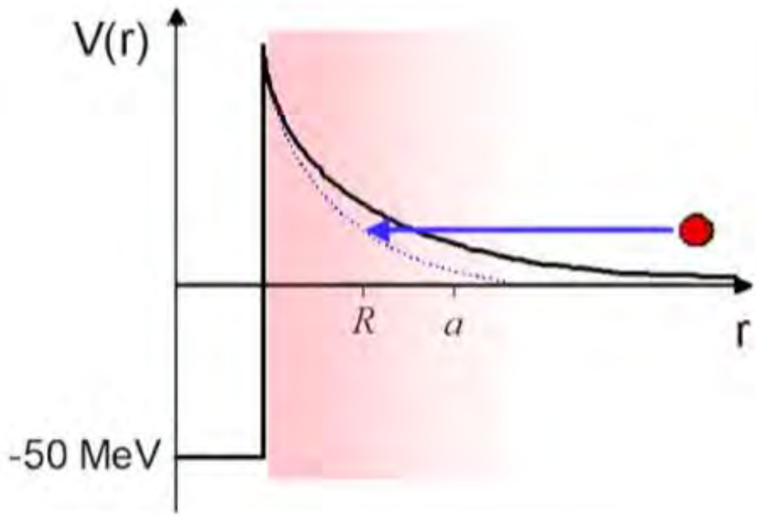
Konrad Czerski. Results of the European CleanHME Project



Konrad Czerski. Results of the European CleanHME Project

Accelerator Experiments:

Electron Screening



$$V(r) = \frac{Z_1 Z_2 e^2}{r} \exp(-r/a)$$

$$\approx \frac{Z_1 Z_2 e^2}{r} - U_e$$

$$\boxed{U_e = \frac{Z_1 Z_2 e^2}{a}}$$

screening energy

$$\boxed{P(E) = \sqrt{\frac{E_G}{E}} \exp\left(-\sqrt{\frac{E_G}{E}}\right)}$$

s-wave penetration factor

$$P(E) \longrightarrow P(E+U_e)$$

model independent approach

Konrad Czerski. Results of the European CleanHME Project

Theory of DD Reactions:

Room Temperature

Resonance cross section:

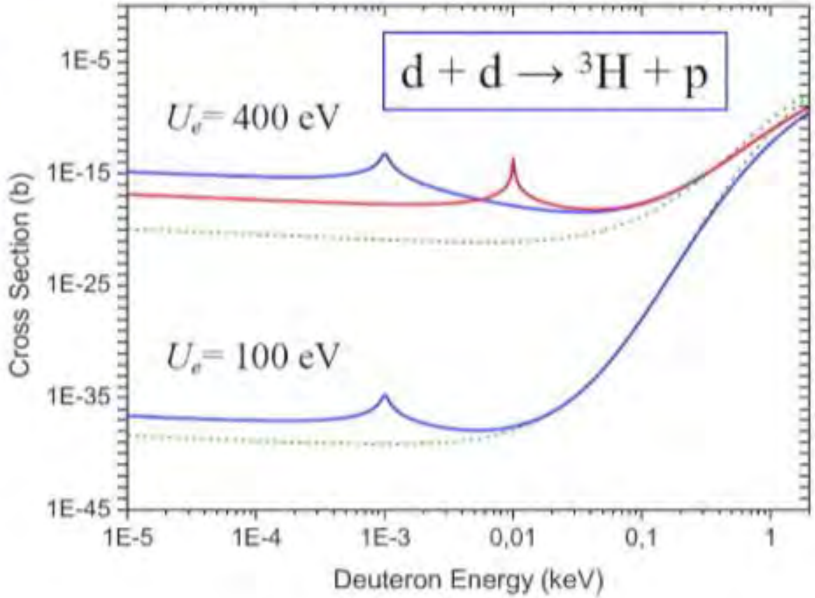
$$\sigma(E) = \frac{\pi}{k^2} \frac{\Gamma_d(E)\,\Gamma_p}{(E - E_R)^2 + \frac{1}{4}\Gamma_\alpha^2}$$

Resonance width also depends on $\boldsymbol{U_e}$

$$\Gamma_d(E) = 2kP(E + U_e)\,|\gamma|^2$$

$$\boxed{\Gamma_\alpha = 0.1\ eV}$$

100g ⇒ 10kW



$$\boxed{\Gamma_\alpha = \Gamma_d + \Gamma_p + \Gamma_n + \Gamma_{pc}}$$

total resonance width

Phys. Rev. C Letters 2022

Konrad Czerski. Results of the European CleanHME Project

Conclusions

1. Heat excess in powder and bulk materials

Electron screening locally enhanced by impurities and crystal defects

nuclear reaction rates at room temperature can change dramatically by 40 orders of magnitude, materials of high screening energy needed.

2. 0^+ threshold resonance in ^4He

Balance between the resonance and electron screening

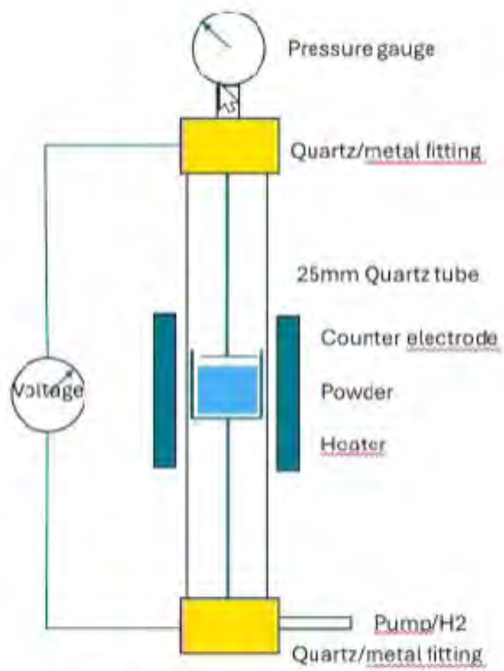
explains ^4He production and increases reaction rates at room temperature up to 7 orders of magnitude, changes the branching ratio, internal e+e- pair production dominates.

3. Demonstration of the cold fusion in accelerator experiments

Consistent DD fusion theory at thermal energies exists.
PP fusion theory still missing. Why is PP so close to DD?

Jean-Paul Biberian. High Temperature LEC experiments

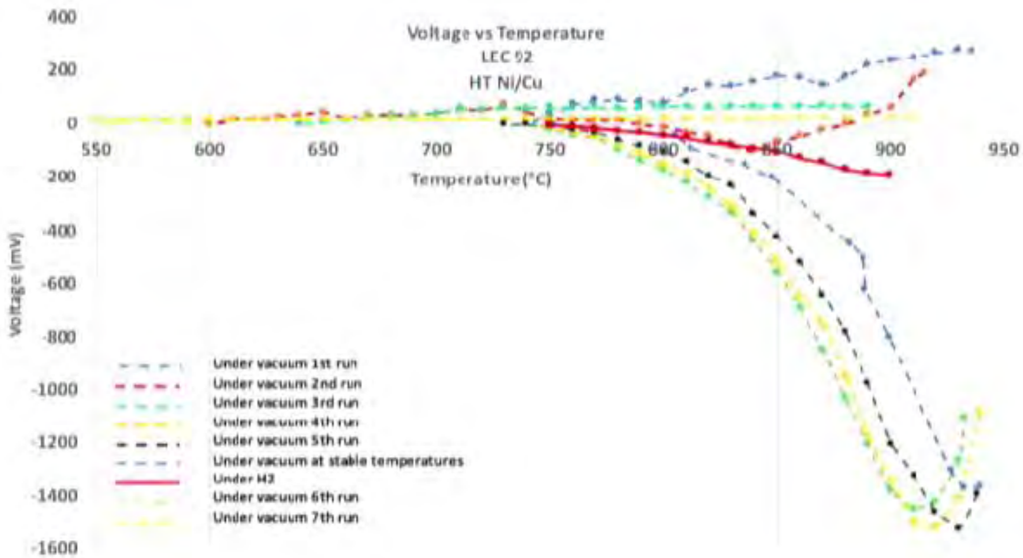
2 – LEC Design



Schematic of the high temperature LEC

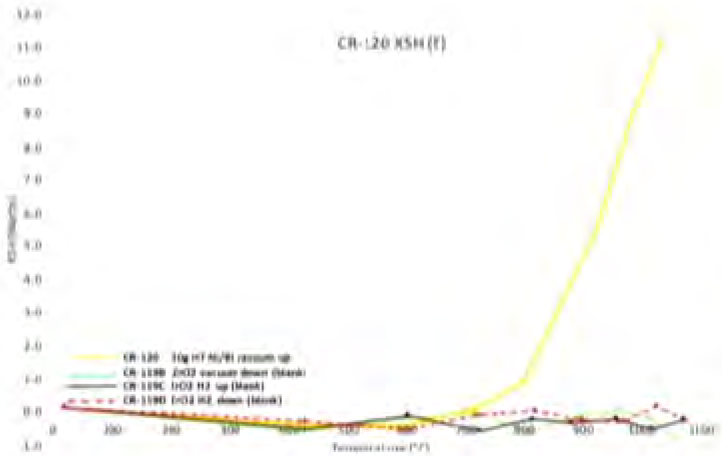
Jean-Paul Biberian. High Temperature LEC experiments

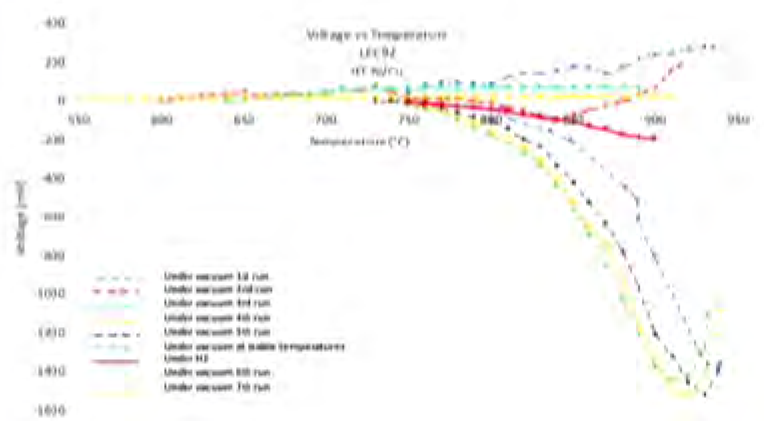
3 – Voltages



Hydrotalcite Ni/Cu

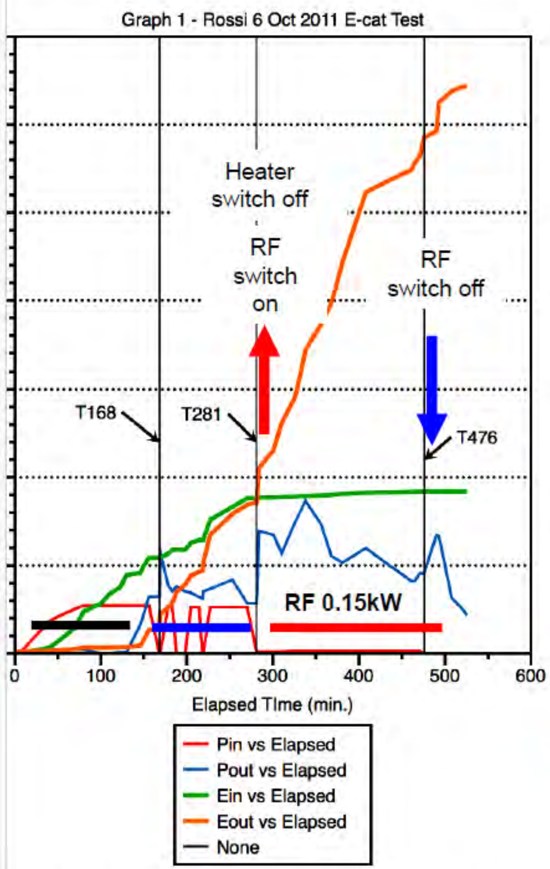
4 – Excess Heat vs LEC





Hydrotalcite Ni/Bi

Vladimir Vysotskii. The Explanation for Mysteries in E-Cat Presentations and Applications



amics of input and output power
total energy in the original E-cat
ng three characteristic stages .

Test of original Energy Catalyzer E-Cat (*Bologna Oct 6, 2011*)

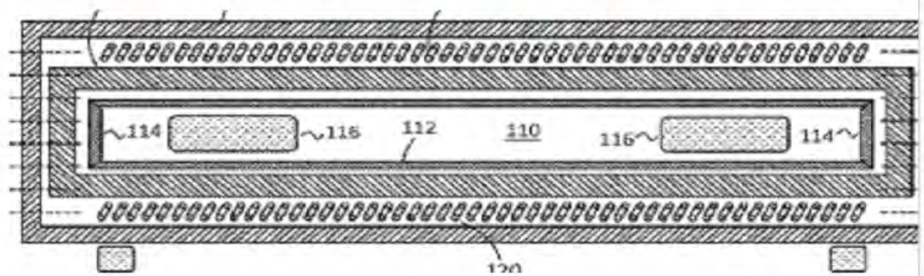
The main control element of the original and replica E-Cat system is a heat-resistant tube with *heating coil* that allows for controlled impact adjustment and an additional similar *non-heating coil* for RF action.

The Fundamental Paradox:

* **Initial COP << 1 (during 1 stage of powerful constant heati**

* **Intermediate COP ≈ 1.3-1.5 (during 2 stage of similar powerful constant heating**

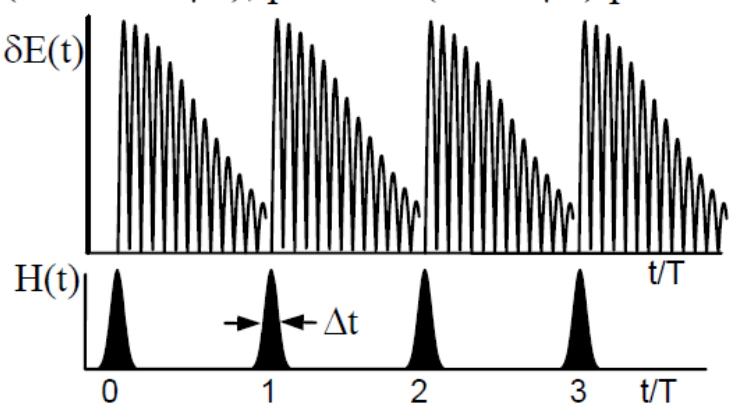
* **Final very large COP ≈ 40-60 during low-power RF action a stage 3**



Vladimir Vysotskii. The Explanation for Mysteries in E-Cat Presentations and Applications

«In our opinion, this is the result of very strong nonthermal influence of external RF current action.»

This report proposes that the primary mechanism underlying these anomalies is the generation of short ($\Delta t \approx 0.25\ \mu s$), periodic ($T \approx 10\ \mu s$) pulses of magnetic field $H(t)$ (see Fig.) induced by RF action within the heating coil, which also is an efficient solenoid. This magnetic field control the pulsed formation of harmonic oscillators with frequency $\omega(t)=eH(t)/m_p c$ for free protons, forming coherent correlated states (CCS) of protons within the active E-Cat chamber [3–6]. The CCS are characterized by giant ($\delta E \geq$ 20-50 keV) and prolonged ($\delta t >> \hbar/2\delta E$) fluctuations in proton kinetic energy [3–6], consistent with the Schrödinger–Robertson uncertainty relation for CCS.



Bin-Juine Huang. Replication of Low-Energy Nuclear Reaction in Water

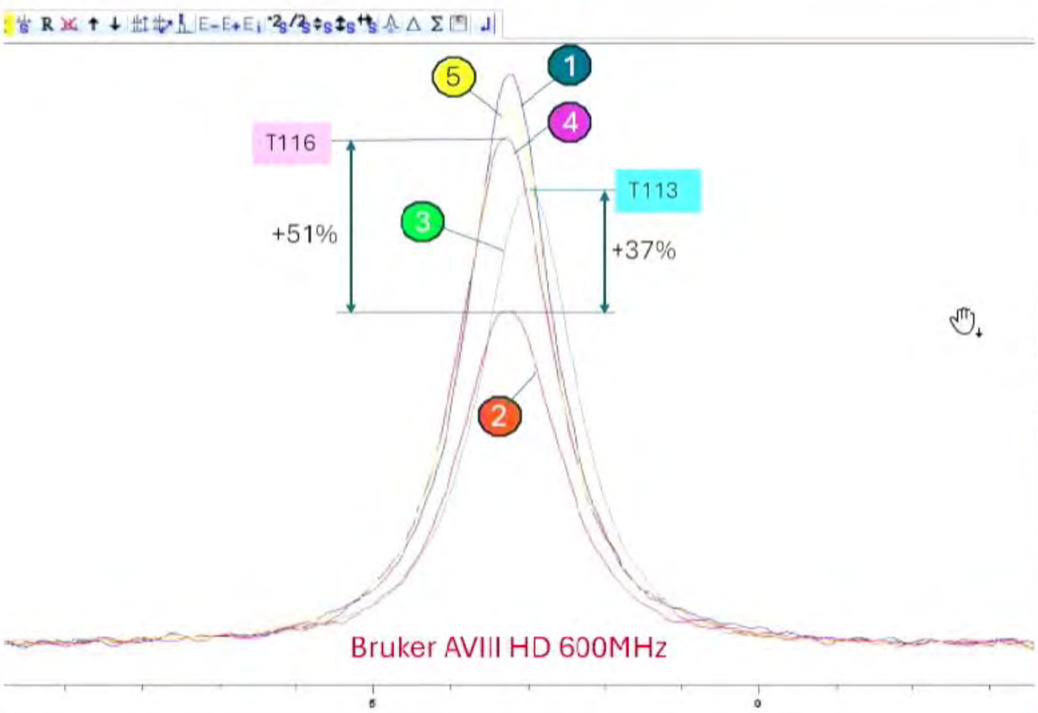
…We further utilized NMR (Nuclear Magnetic Resonance) technique as an alternate method to analyse the ^{17}O isotope contained in the output water produced by a reactor (DEX-1Aa).

The ^{17}O NMR peak signal intensity was found to be 35% higher than the background value of the reactor input pure water.

It was confirmed that the LENR of water can produce the isotope ^{17}O and further form isotopic compounds including $H_2{}^{17}O$, $^{12}C^{16}O^{17}O$, $^{12}C^{17}O^{17}O$, $^{16}O^{17}O$ and $^{17}O^{17}O$, which is the source of the NMR peak signals.

Bin-Juine Huang. Replication of Low-Energy Nuclear Reaction in Water

2) Identification of isotope 17O using NMR (Nuclear Magnetic Resonance)



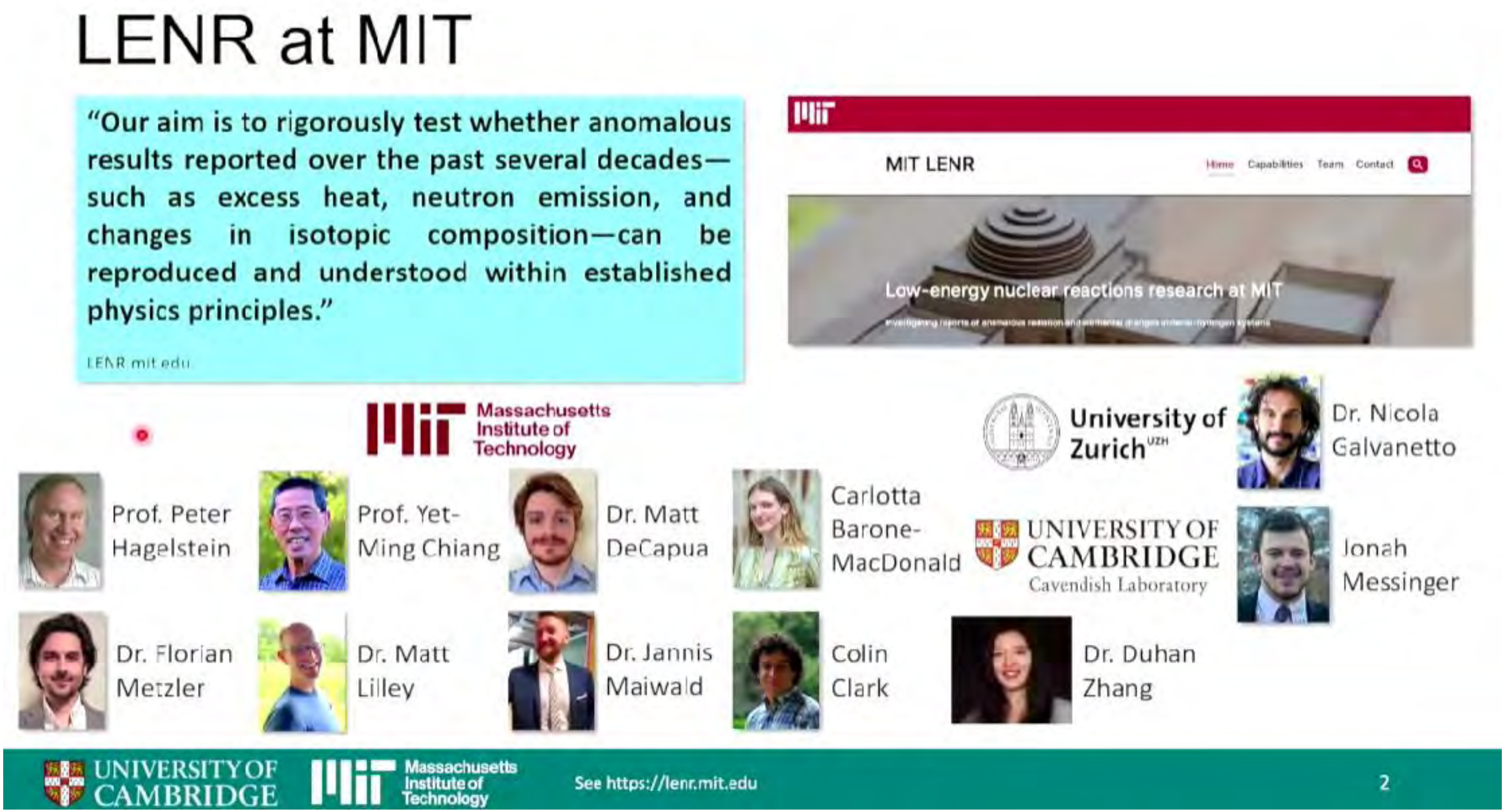
Bin-Juine Huang. Replication of Low-Energy Nuclear Reaction in Water

- **CRDS is consistent with MS measurements**
  - Excess ^{18}O isotope compounds were observed using MS
  - Physics inside needs to be studied

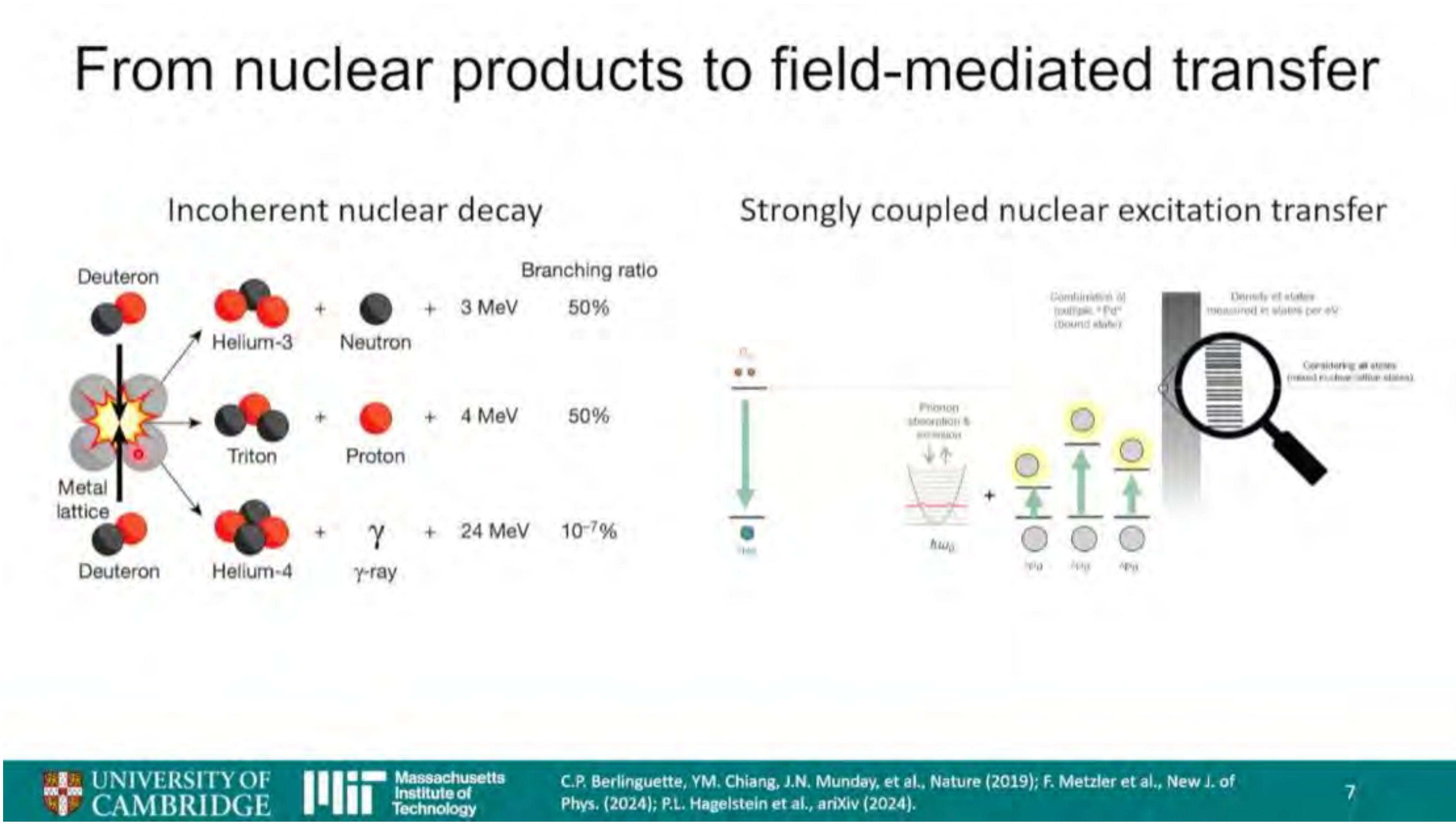
No.	Reactor	Gas Sample	COPx	LENR COPx >1.05		^{17}O isotope gases					^{18}O isotope gases				
					^{22}Ne	$H_2{}^{17}O$ HDO	$^{16}O^{17}O$	$^{17}O^{17}O$	$^{12}C^{16}O^{17}O$	$^{12}C^{17}O^{17}O$	$H_2{}^{18}O$ $D_2{}^{16}O$	$^{17}O^{18}O$	$^{18}O^{18}O$	$^{12}C^{17}O^{18}O$	$^{12}C^{18}O^{18}O$
					LL22	LL198 LL19	LL33	LL34	LL45	LL46	LL20	LL35	LL36	LL47	LL48
1	RNJ-A1	**Tube64**	1.27	strong (>1.2)	3.82	5,11	1.12	0.99	2.73	2.43	1.11	2.58	1.24	1.48	1.53
2	nDJT-B	**Tube67**	1.21	strong (>1.2)	3.82	6.58	1.18	1.02	3.33	2.82	1.17	4.50	1.30	4.97	1.74
3	DEX-1(1)	**Tube69**	1.12	weak	1.09	1.41	0.99	1.01	0.84	0.81	0.98	2.40	1.41	1.81	0.98
4	JT2	**Tube70**	1.04	No	**0.51**	**0.83**	**0.87**	**0.95**	**0.34**	**0.44**	**0.95**	**1.00**	**1.04**	**1.01**	**0.81**
5	VCS(5RT)	**Tube76-1G**	1.65	strong (>1.2)	1.62	6.88	7.77	2.90	2.29	1.72	0.11	73.2	11.12	5.12	1.94
6	DEX-1(2)	**Tube81**	1.25-1.37	strong (>1.2)	4.17	6.13	4.04	1.58	6.48	3.63	4.70	9.12	1.87	4.19	2.61
7	DEX-1D	**Tube94**	1.12	weak	1.84	1.36	0.90	0.83	1.80	1.22	1.11	1.06 <	1.22	1.48	0.96
8	DEX-1Aa	**Tube96**	1.32	strong (>1.2)	1.64	1.32	1.13	0.96	1.93	1.01	1.11	1.14	1.07	1.42	1.06
9	JT5-A3V1	**Tube108**	1.20	strong (>1.2)	1.39	1.16	1.01	0.98	2.01	1.20	1.06	0.99	1.00	1.86	0.92
10	SRJ-5	**Tube111**	1.16	weak	1.17	1.54	1.19	0.99	1.21 <	1.46	1.11	1.86	0.98	1.48	0.79
11	**VCS(5RT)**	**Tube 116**	1.60	strong	18.14	**15.64**	3.23	2.28	9.80	21.21	8.08	16.49	9.47	46.06	3.64

I## (gas) = m/z ##(gas) ÷ m/z 40 (gas); **##: mass number** **BG: background samples [unreacted water]**
LL##(gas) = I##(gas)/I##(BG);
For water: L198 (gas) = m/z 19(gas) ÷ m/z 18(gas); **LL198= L198(gas) / L198(BG)**

Jonah Messinger. Dicke-Enhanced ^{57}Fe Nuclear Supertransfer and Implications for Solid-State Nuclear Reactions



Jonah Messinger. Dicke-Enhanced ^{57}Fe Nuclear Supertransfer andImplications for Solid-State Nuclear Reactions



Индустриальная сессия

- CleanPlanet (Япония)
- ENG8 (Португалия)
- HYLENR (Индия)

Masami Hayashi. Development of Quantum Hydrogen Energy and its practical applications **[CleanPlanet]**

Full-Scale Development Now Underway

$7M Grant from the Tokyo Metropolitan Government

- A new project launched in April 2025 to build a pilot plant in preparation for mass production

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Health Law & Business

Fusion Startup Wins Tokyo Grant for Low-Temperature Technology

April 10, 2025, 6:00 PM GMT+9

Will Wade
Bloomberg News

Clean Planet Inc., a Japanese energy startup, received a 1 billion yen ($6.8 million) grant from the Tokyo Metropolitan Government to commercialize its low-temperature nuclear fusion technology.

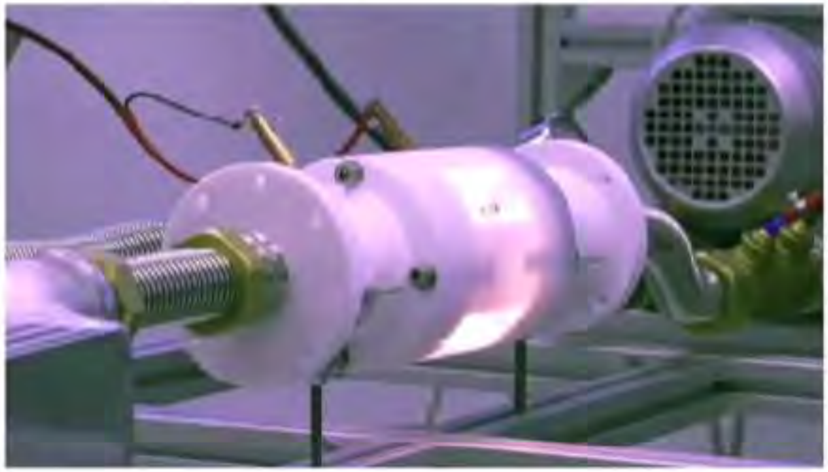
The funds were awarded through a city program aimed at promoting zero-emission technologies, according to a statement Thursday, and Clean Planet will use the grant to help build a production facility.

Haslen Back. The ENG8 EnergiCells **[ENG8]**

THE ENERGICELL®

ENG8 is developing **LENR reactors (EnergiCells)** that are being tailored for diverse market applications. These include:

1. Generating **hot air** up to and in excess of 1,000°C.
2. Producing **high-pressure** and **high-temperature steam**.
3. Delivering **electricity**, both directly and indirectly.
4. Producing **hydrogen, oxygen & HHO gases** directly.



ENG8

CLEAN ABUNDANT ENERGY

Haslen Back. The ENG8 EnergiCells **[ENG8]**

ENERGICELL SYSTEM & COP/Q CALCULATION

EnergiCells fit into a system:

- A vessel where we create a high voltage and frequency plasma between anodes and cathodes where a working fluid is injected to provide the "fuel" and cooling. That's the EnergiCell.

Plus:

- A plasma generator / power supply unit.
- A cooling and "fueling" pump.
- Energy is extracted either via the working fluid or via an electrical circuit.
- Energy conversion; thermal to electrical power via a compound steam engine.
- A battery for cold starts.

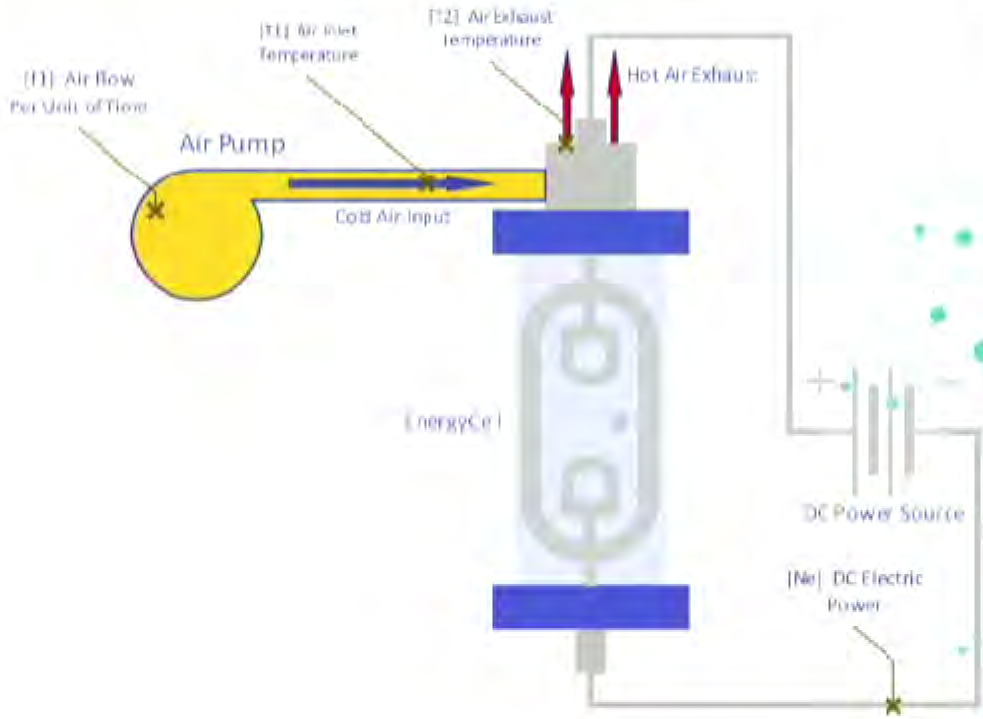
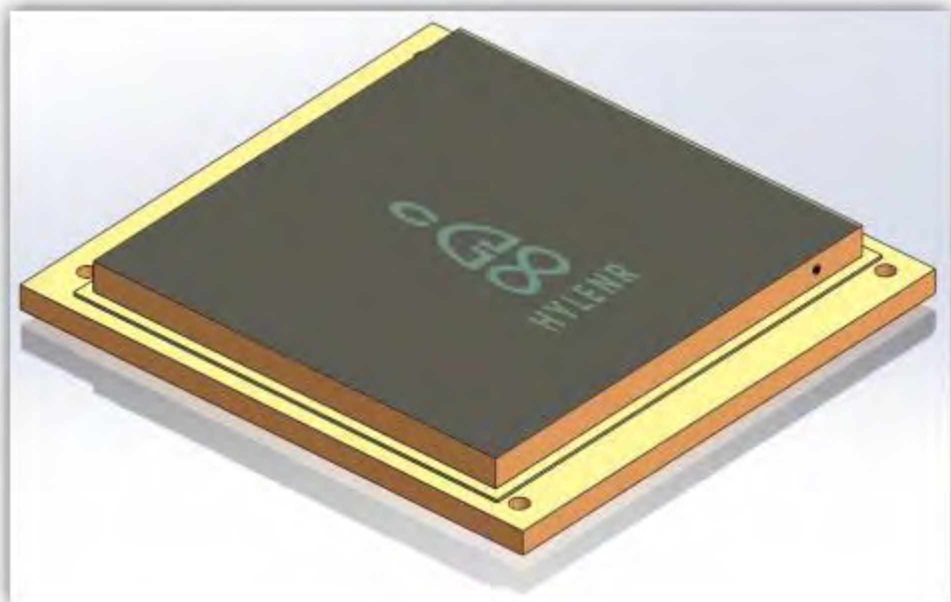


Figure – 1: Schematic representation of the EnergyCell.

ENG8
CLEAN ABUNDANT ENERGY

Siddartha Durairajan. Advancements in Low Energy Nuclear Reactions (LENR) for Sustainable and Efficient Energy Production **[HYLENR]**

Our system employs minimal hydrogen and a small electrical input to produce significant excess heat/electricity. Recently the company has achieved improved coefficient of performance (COP), which has increased from 1.5 to values as high as 1.78, repeatedly and consistently with occasional peaks reaching 2.



- Вопрос потребления водорода

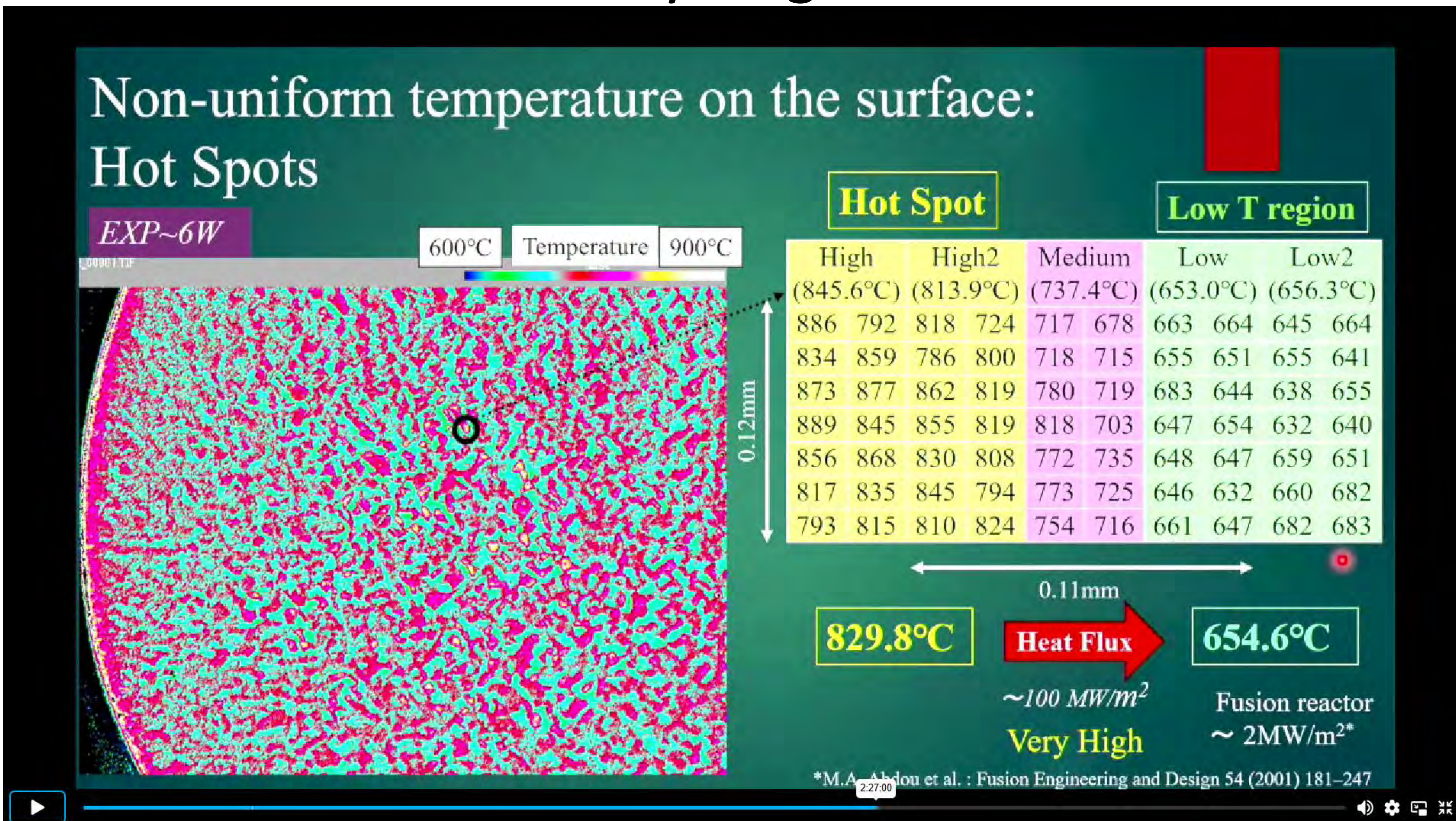
Доклады «на полях»

Bob Greenyer. Matsumoto Memorial Lecture

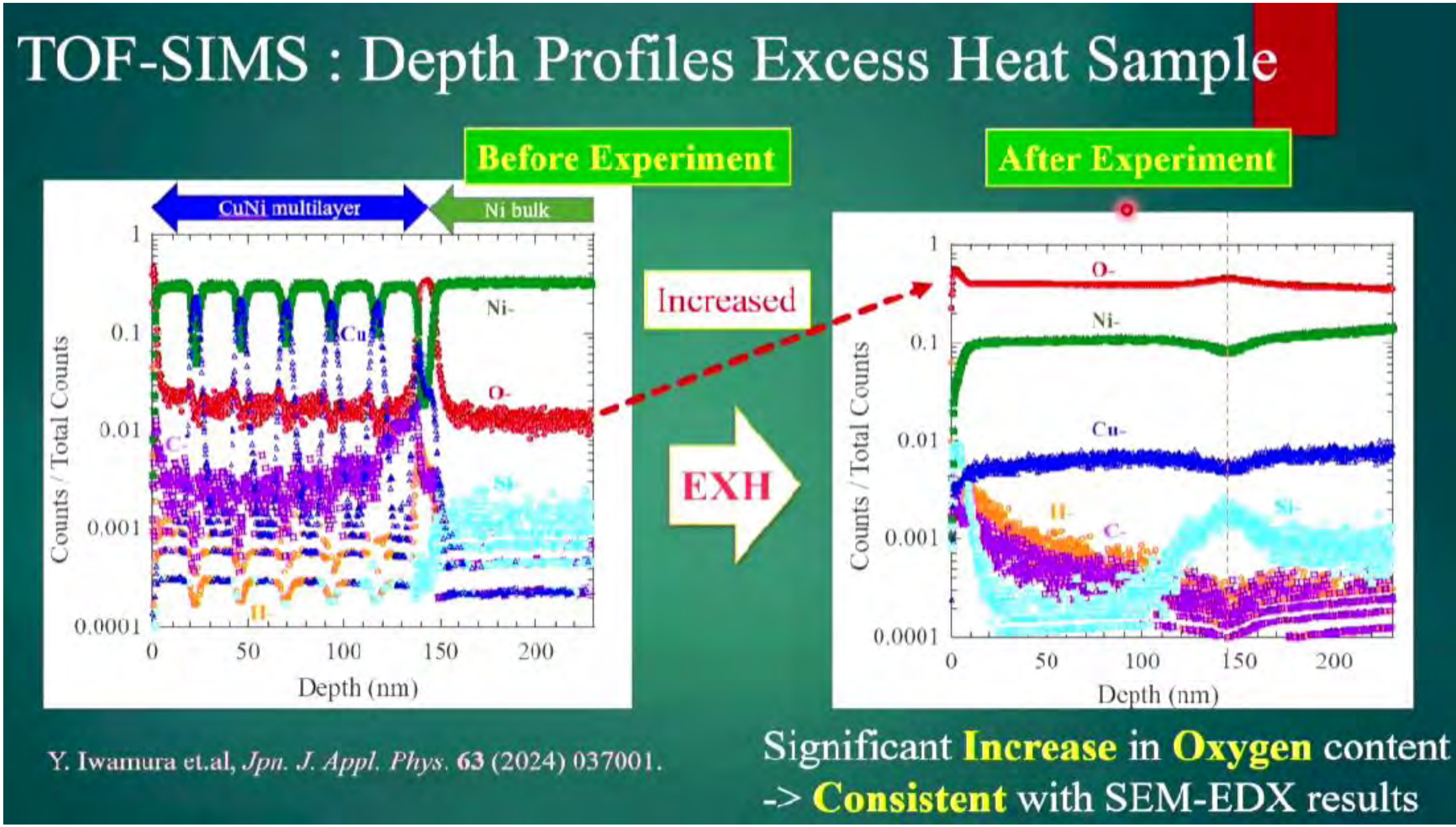
Доклады «на полях»

Vladislav Zhigalov off-piste talking about Vortex Heat Generators - ICCF26 - Morioka, Japan 2025

Yasuhiro Iwamura. Hot spots and melted regions observed during anomalous heat generation using nanostructured Ni composites and hydrogen



Yasuhiro Iwamura. Hot spots and melted regions observed during anomalous heat generation using nanostructured Ni composites and hydrogen

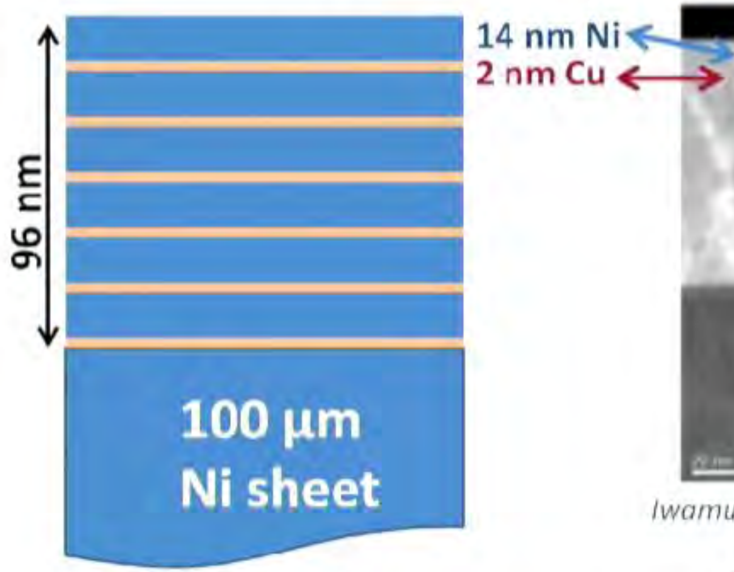


Tatsumi Hioki. An XAFS study on the surface structure after anomalous heat generation experiments using a material system of Ni-Cu multilayer on Ni substrate

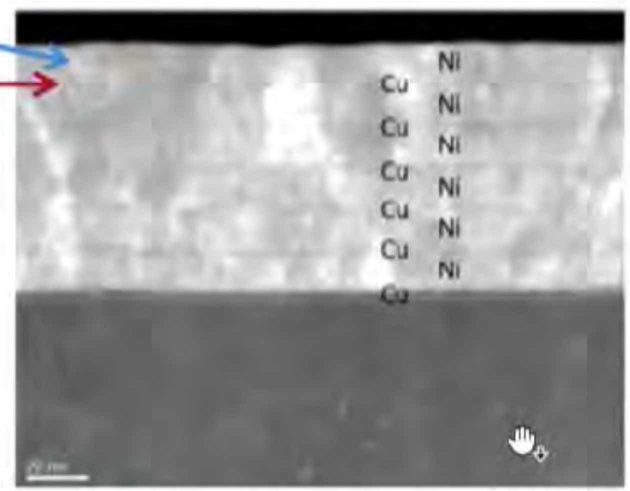
AHG (Anomalous Heat Generation) **by Iwamura method**

Typical initial multilayer structure on Ni sheet

6 × {Ni (14 nm)/Cu (2 nm)} / Ni(100 μm)



Schematic



Iwamura et al., Jpn. J. Appl. Phys. 63, 037001 (2024)

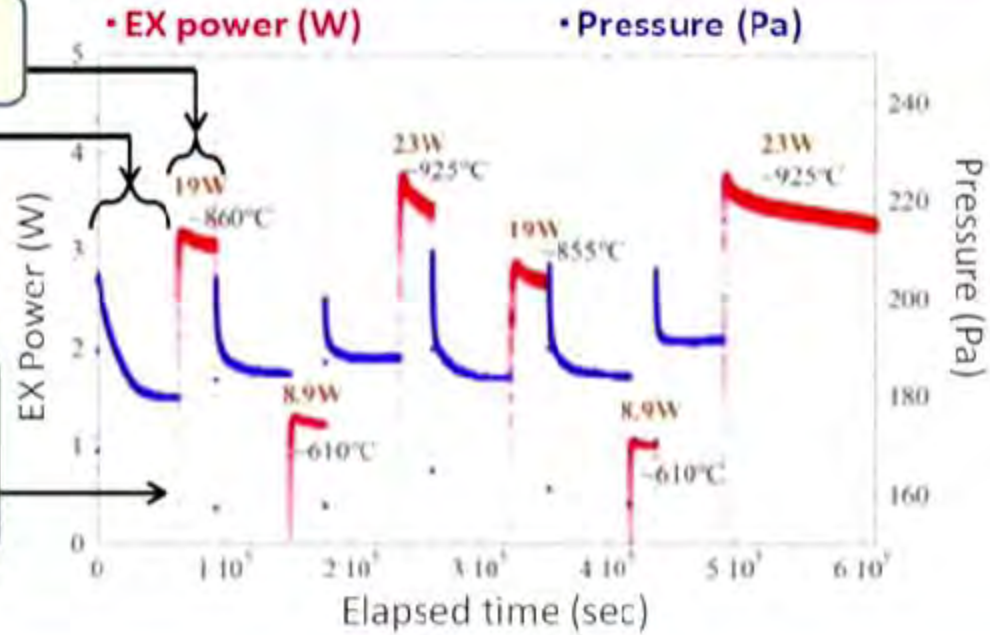
Cross section TEM

AHG experiment
with 6 × {Ni (14 nm)/Cu (2nm)} on Ni (0.1 mm)

~3W excess heat generation for 8h

Hydrogen absorption process : 16h

Simultaneous evacuation and heating to 860 °C by19W Input power



$$\text{Excess energy Density} = \frac{\text{[total excess energy]}}{\text{[Number of absorbed hydrogen]}} = 16 \text{ keV/H}$$

⇨ **Unexplainable by chemical reactions**

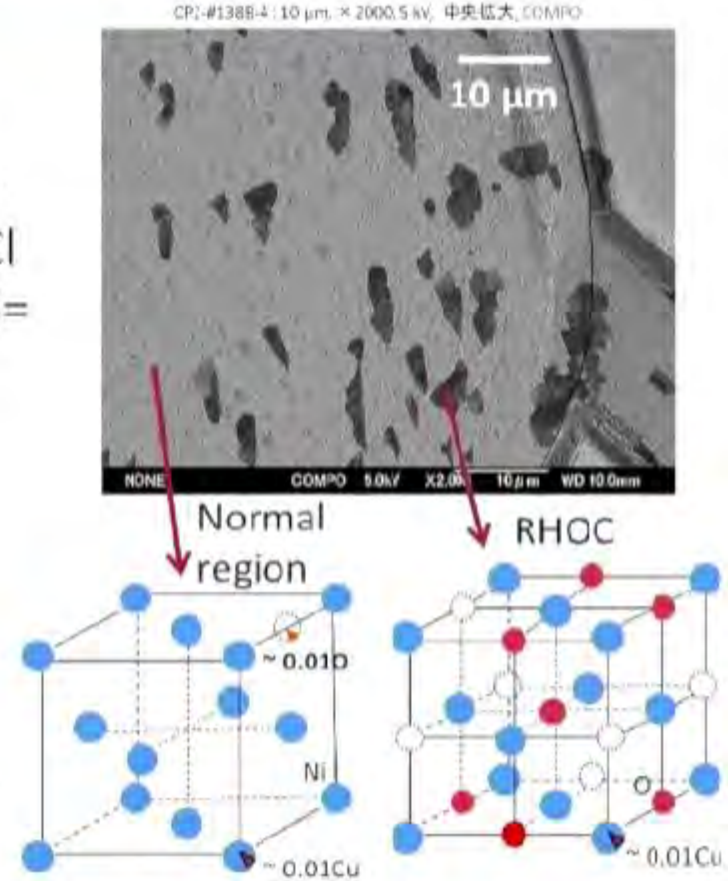
⇨**Nuclear reaction ?** ⇨ **However, γ-ray/ neutron/ ^{4}He were not observed.**

Iwamura et al, Jpn. J. Appl. Phys. 63, 037001 (2024)

Conclusion (I)

1. Approximately 5 % of Ni and Cu atoms in the surface layer of the sample after AHG experiment were suggested to be in the chemical state similar to $(Ni_{1-x}Cu_x)O_{1-\delta}$ with cubic NaCl type structure, where x = ~ 0.01 and δ= 0.2 ~ 0.45.

2. RHOC regions corresponds to the above described region. The remaining normal regions are metallic FCC-Ni, alloyed with ~ 1 at% Cu, where at most 1 at% O-atoms randomly occupy the interstitial sites (octahedral symmetry) of the FCC alloy.



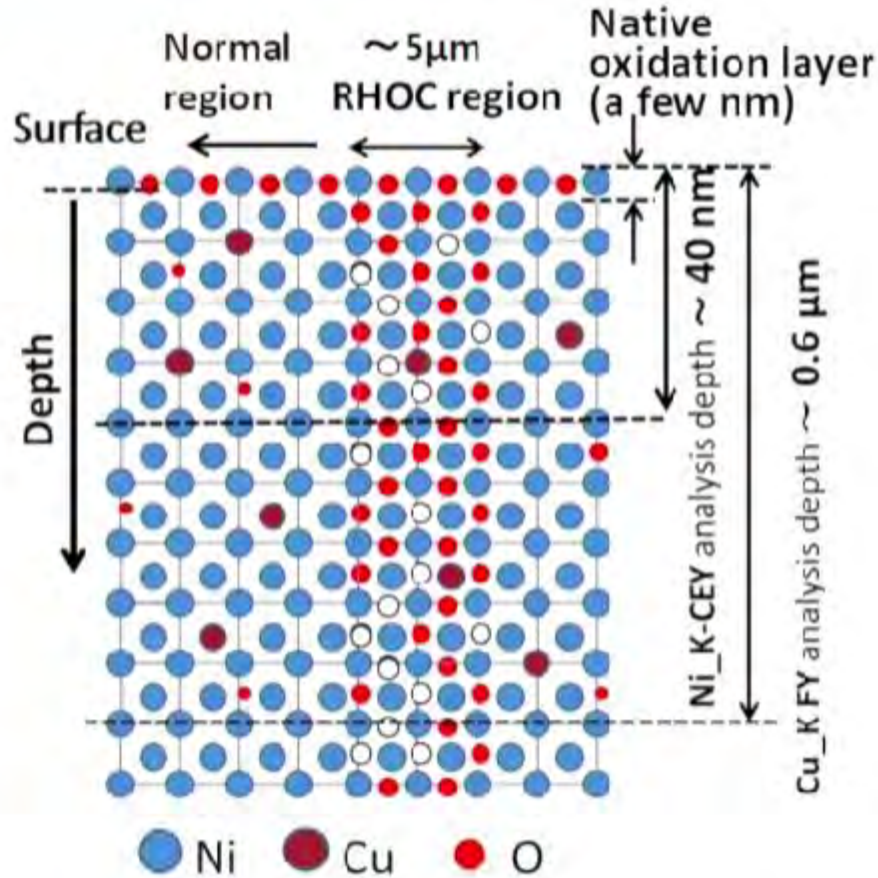
$Ni_{0.99}Cu_{0.01}O_{0.01}$ $Ni_{0.99}Cu_{0.01}O_{0.625}$

Conclusion (II)

3. From Ni-K edge CEY-XANES spectrum, it was suggested that RHOC may extend to a depth larger than ~ 40 nm which is much larger than the native oxidation layer (a few nm) of Ni metal.

From Cu-K edge FY-XANES, RHOC was suggested to extend to a depth larger than 0.6μm.

It is probable that RHOC extends to a depth of μm order, far deeper than the initial multilayer thickness of ~ 100nm.



Francesco Celani. Anomalous Heat Effects via Longitudinal and Transversal Excitations in Constantan Wires: Advances in Electromigration and Plasma Generation

1. Experimental Motivation and Rationale for Our (Often Unconventional) Approach

1.1 Origin and Early Observations

- Our investigations began in the immediate aftermath of 1989 announcements by M. Fleischmann-S. Pons and S. Jones.
- From the outset, we observed that unexpected yet potentially ***valuable effects emerged only under conditions of forced non-equilibrium***. Later-on, we concentrated on experiments aimed to induce Anomalous Heat Effects ***(AHE)***.
- The **nonequilibrium states,** in the whole, were induced by a wide array of enough **fast/strong stimuli**: electrical, magnetic, thermal, mechanical (pressure), acoustic (ultrasound), and even nuclear inputs. We concentrated, mainly, on the use of electromagnetic stimuli because enough easy to accomplish by modern powerful/fast electronic components.

1.2 Foundational Insight Behind Our Methodology

- This key insight—that ***anomalous effects are highly sensitive to non-equilibrium states—has been the cornerstone of our experimental philosophy.***
- We found: **intensity and nature of these effects depended critically on the intrinsic properties of the materials used.**
- Notably, **ultra-pure palladium** (Pd), despite its theoretical appeal, **failed to generate any measurable AHE** under both electrolytic and gas-phase conditions—even with strong electrical stimulation.
- Consequence: ***pivotal role of microstructural defects, vacancies, specific impurities in enabling AHE.*** **Such factors are notoriously hard to identify/quantify and/or replicate on demand➔ further** ***basic research studies are needed.***

1.3 Focus on Forced Hydrogen/Deuterium Flux

- ***Our work progressively emphasized the role of "forced" hydrogen (H_2) or deuterium (D_2) flow through absorbing materials,*** especially under dynamic temperature and pressure conditions.
- The interplay between pressure, temperature, concentration (P–T–C), and the timing of gas/power application, crucially determines the hydrogen-to-metal (H/M) ratios achieved.
- These dynamic conditions directly influence the magnitude and reproducibility of AHE.

2:43:54

Historic Benchmark: G. C. Fralick's 1989 NASA Experiment

One of the earliest confirmations came from a pioneering—though initially confidential—experiment made by **Gustav Carl Fralick** at **NASA** (**December 1989**): Deuterium was forced through an aged porous Pd tube at temperatures above 300 °C: hydrogen used as a control ➔ the results, consistent and reproducible, became validated over two decades of refinement and re-testing, providing a solid empirical base for further studies.

1.5 Replacing Palladium: the shift to Constantan Alloys

Beginning in **2011**, we adopted ***low-cost Constantan wire*** ($Cu_{55}Ni_{44}Mn_1$) as a substitute for expensive palladium, enabling broader and more sustainable experimentation. In addition, it was observed that also the ***low-cost H***, instead of the expensive D, was able to induce AHE.

This approach was echoed in parallel, and independent, research streams, using also different ratios of Ni/Cu:

* A. Takahashi's team (***Osaka and Kobe Univ.; -J***) investigated Ni-Cu nanopowders.

* Y. Iwamura's group (***Tohoku Univ., Mitsubishi; - J***) developed multi-layered nanostructures, later validated by Prof. J. Kasagi. Mostly hydrogen flux experiments, by pressure-vacuum cycles, at high temperatures.

* ***CleanPlanet*** Inc. (**Kawasaki, -J**), under CEO I. Yoshino, is currently pursuing high-temperature H-flux experiments (750–950 °C), for technological/industrial/commercial purposes.

* D. Alexandrov (***Lakehead University, -Canada***) introduced Constantan wire setup under vacuum, heated to over 600 °C by 60 Hz AC: resulted in rapid deuterium uptake and AHE detection depending initial on wire's temperature. We think: his recent and reproducible experiments (T=**960 °C**), because extremely fast time (**<<1s**)/high temperatures (**>>1200 °C**) for the reactions, ***could be adopted even for space propulsion***➔ **suggested by us (March 24, 2025) to International people active in the field.**

1.6 Strategic Evolution and Historical Roots

The original concept of using Cu-Ni alloys with deuterium traces back to **Prof. Brian Ahern** (**EPRI, USA**, 1995), who discreetly included the idea in a patent—unnoticed by most of the LENR community for years.

Since August 2020, in the framework of the CleanHME Project (**EU H2020**, Grant No. 951974; EU "supervisor/interface" **Maurizio Maggiore**), our goals have focused on practical approaches, toward the ***use of AHE for every-day life applications***:

- Developing simple and low-cost methods for enhanced H_2/D_2 incorporation in commercially-available Constantan wires.
- Using high-efficiency and budget-friendly pulse generators (dimmer), to reach high power output-to-input (P_out/P_in) ratios.

2. Key Experimental Findings and Future Directions

2.1 Longitudinal Excitation: High Current Density in Thin Wires

Under longitudinal current flow, thin Constantan wires (Main Electrode, ME) can exhibit strong AHE, mainly in line with:

- The **Fukai–Staker** model of hydrogen super-concentration at defect-rich lattice sites, and/or voids, under electromigration.
- **G. Preparata**'s theory (**1995**), proposing "***coherent voltage drops***" across metallic conductors under specific conditions.

2.2 Transversal Excitation: Discharge Modes and Near-Surface Effects

Experiments resumed with transverse excitation, using a Counter-Electrode (CE) placed few mm from the wire.

By ***adjusting CE distance, gas composition, pressure, voltage***:

- We triggered regimes such as Paschen breakdown and Dielectric Barrier Discharge (DBD, or "Siemens Effect").
- These discharge modes are more energy-efficient under pulsed operation, enhancing AHE at low input power.

General set-up of reactor and inner core

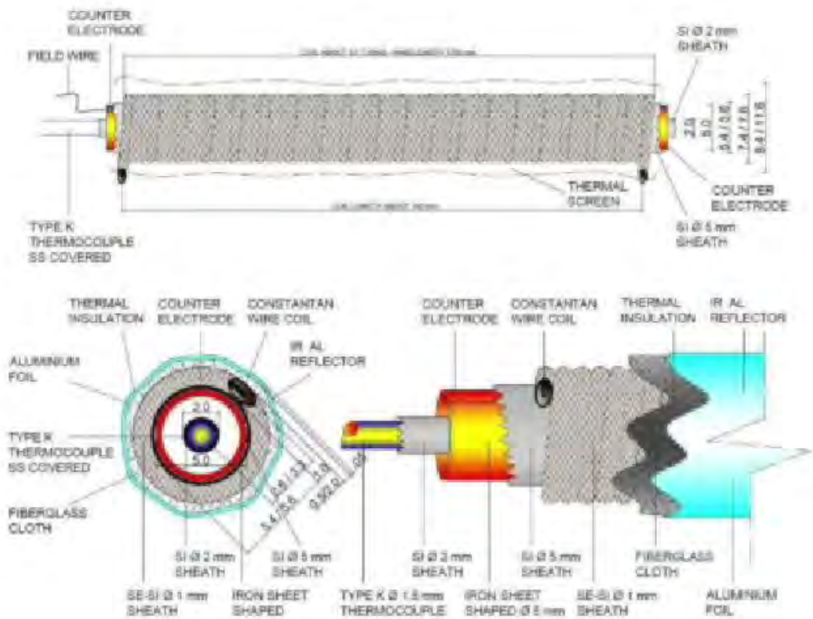
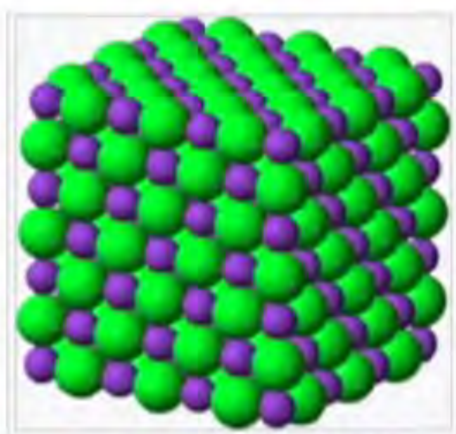


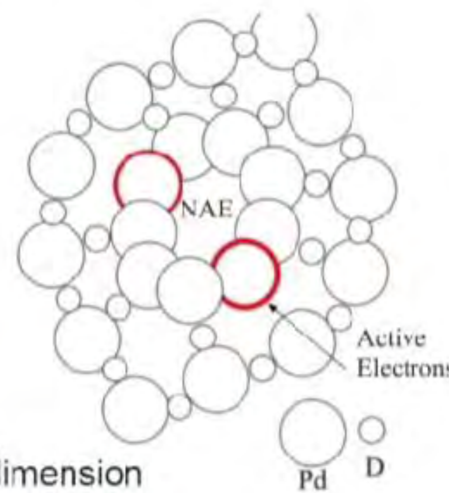
Fig. 2 – Final Coil Assembly Configuration

This figure (and description) illustrates the updated assembly also of the counter-electrode (CE) employed in recent reactor designs. In previous configurations, the CE consisted solely of a **thin-wall Fe tube (as shown in the figure, red-yellow colour)**, encased in an **electrically insulating sheath made of quartz-alumina fibres**. As of **February 2024**, the CE has been upgraded to a **coiled pair of Constantan and Fe wires** (**Φ = 315 µm**), surface-treated and arranged in parallel, functionally similar to a **J-type thermocouple**. The new coil is wrapped (nearly insulated) around the **main K-type thermocouple**, which is **stainless steel-sheathed** and utilized for precise temperature monitoring. The entire assembly forms a coaxial geometry, maintaining the compact and efficient layout established in earlier designs while enhancing performance and thermal sensitivity.

Edmund Storms. A New Understanding of Cold Fusion Based on the Observed Behavior

Atom Arrangement for the PdD Lattice and NAE





NAE is a three dimension physical void surrounded by electrons on all sides imbedded in the crystal structure.

Nuclear Active Environment

Edmund Storms. A New Understanding of Cold Fusion Based on the Observed Behavior

Examples of How the NAE can be Created

Codeposit (CoD) of a metal (surface)

- Szpak: Slow electrolytic deposit of $PdCl_2$ + LiCl or HCl in D_2O

Sintering of small particles (bulk)

- Arata: Palladium black

Imbedded inert particles in Pd (bulk)

- Storms: Particles of CaO or SiO_2 < 36 micron

Creation of porous material (bulk)

- Takahashi: Oxidized Pd+Zr alloy
- Case: Charcoal + Pd particles
- Mizuno: Stress induced gaps In Ni
- Iman et al.: Stress induced gaps in Pd-B alloy

Accidental formation (surface)

Damage caused by gas discharge

Damage caused by super wave

Damage caused by extended electrolysis

Damage caused by ultra sound and cavitations

- Nano-machining (surface)

Edmund Storms. A New Understanding of Cold Fusion Based on the Observed Behavior

Nature of the Cold Fusion Reaction

1. Coulomb barrier is overcome without applied kinetic energy by a concentrated assembly of electrons.
2. Mass energy is emitted as energetic ion radiation and energetic electrons with helium as the final nuclear product when deuterons fuse. Deuterium results as the nuclear product when H fuse. Tritium results as the nuclear product when H and D fuse. Neutrons and helium result when D and T fuse.
3. The momentum is conserved during each fusion process by the emission of electrons. Only the electrons ejected by d-d fusion have enough energy to escape the material and be detected.
4. The process is spontaneous in the required environment identified as the NAE.
5. Secondary nuclear reactions with energetic emission are produced by local hot fusion and transmutation reactions.

Edmund Storms. A New Understanding of Cold Fusion Based on the Observed Behavior

SUMMARY

Conditions required to create fusion energy

- A special condition (NAE) consisting of a void having a special small size must be formed in large numbers by suitable treatment.
- The material must be exposed to an isotope of hydrogen, preferably deuterium as the fuel.
- The fuel must be caused to move more rapidly from its normal locations in the material to assemble in the NAE.
- A practical generator requires the spent NAE to be easily replaced.

Shunji Tsuji-Iio. Nuclear Transmutations to Nuclei with Magic Numbers Induced by Deuterium Permeation through Pd/CaO Multilayer Films

Conclusions of nuclear transmutation observed at Tokyo Tech.

When one CaO layer exists in a Pd film, nuclear transmutation occurs to nucleus with magic number as shown bellow at not only upstream side but also down stream side by D_2 permeation.

Ba-136 → Ce-140 (neutron number: **82**)
Cs-133 → Pr-141 (neutron number: **82**)
Pd-104 → Sn-112 (proton number: **50**)

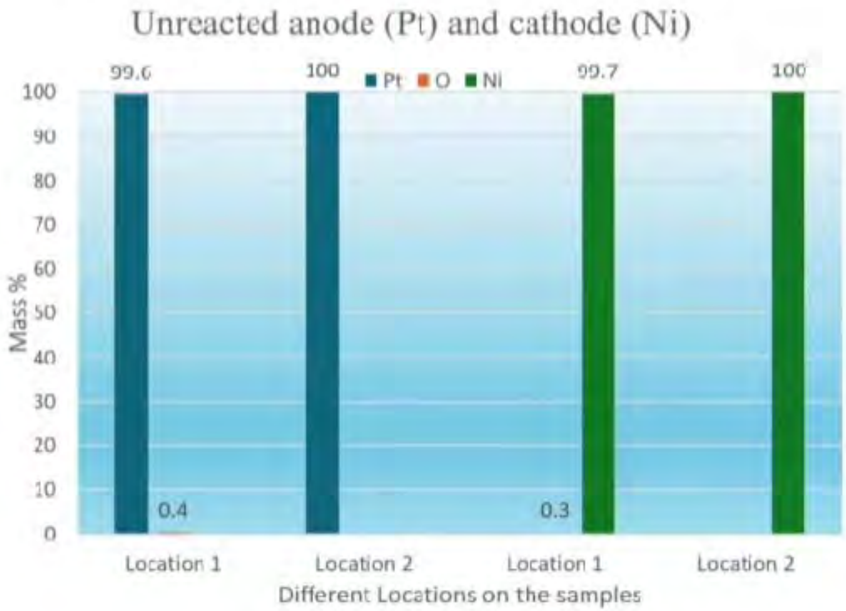
From TOF-SIMS counts, characteristic X-ray intensities and natural abundance of initial isotopes, the transmutations occur easily following the above order.

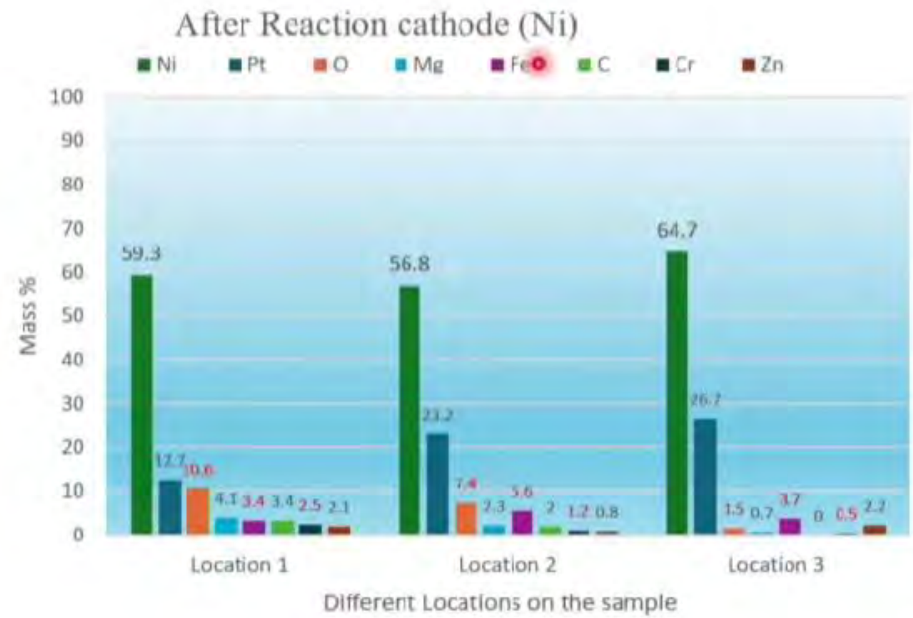
Gamma rays above background levels were never detected.

Monu Kumawat. Transmutations in Light Water Electrolysis and HydrogenGas Loading Experiments

Light water electrolysis (Pt anode-Ni cathode)

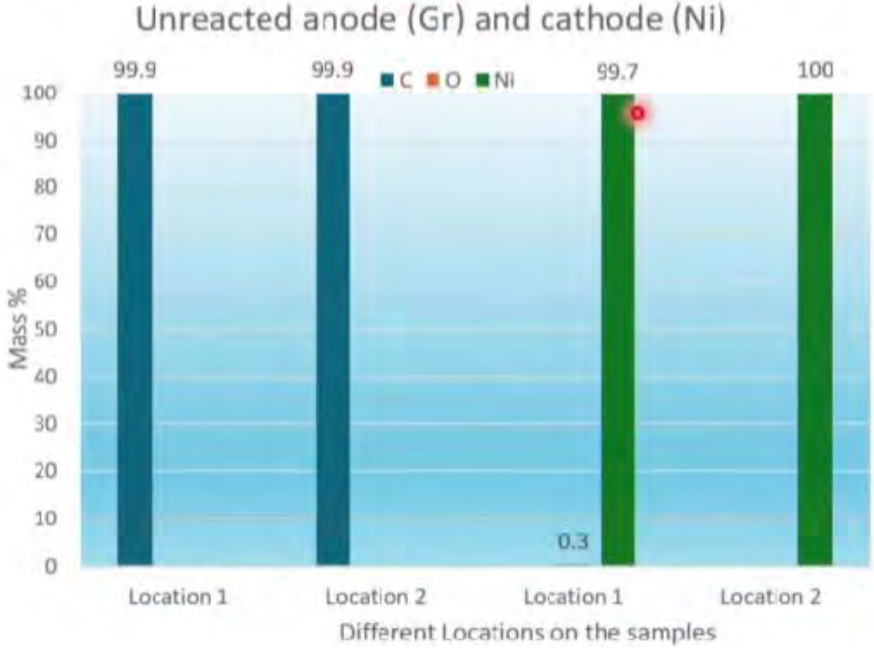
Anode – Pt
Cathode – Ni
Volage – 5 V
Current – 0.36 – 0.41 A/cm^2
Analysis Technique - EDX

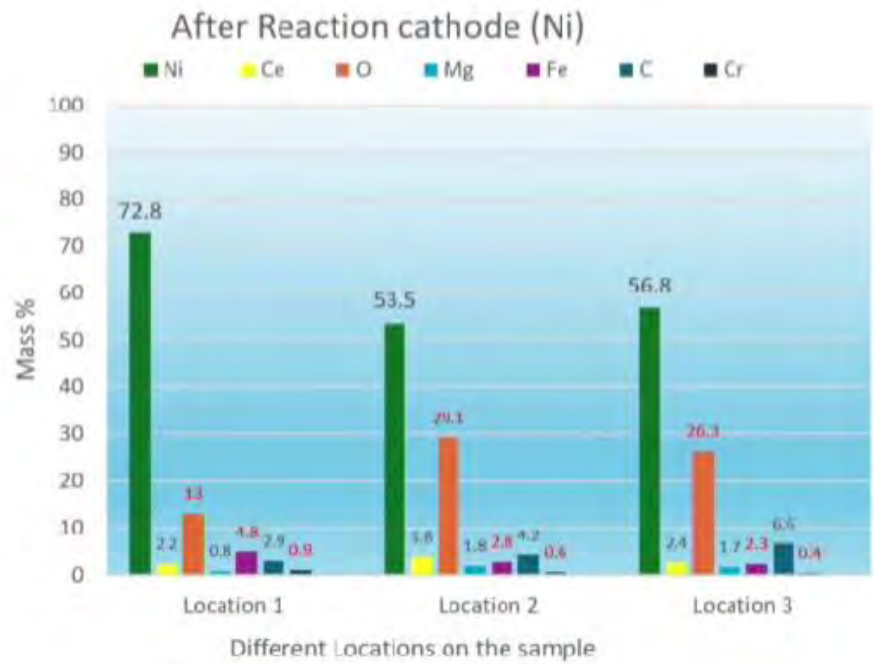




Light water electrolysis (Gr anode–Ni cathode)

Anode – Gr
Cathode – Ni
Volage – 5 Volt
Current – 0.56 – 0.61 A/cm^2
Analysis Technique - EDX





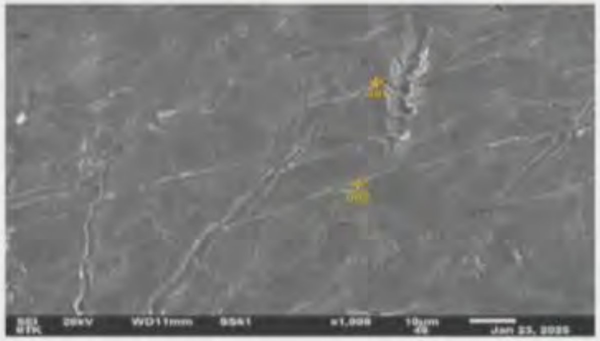
Comparison between Pt-Ni and Gr-Ni

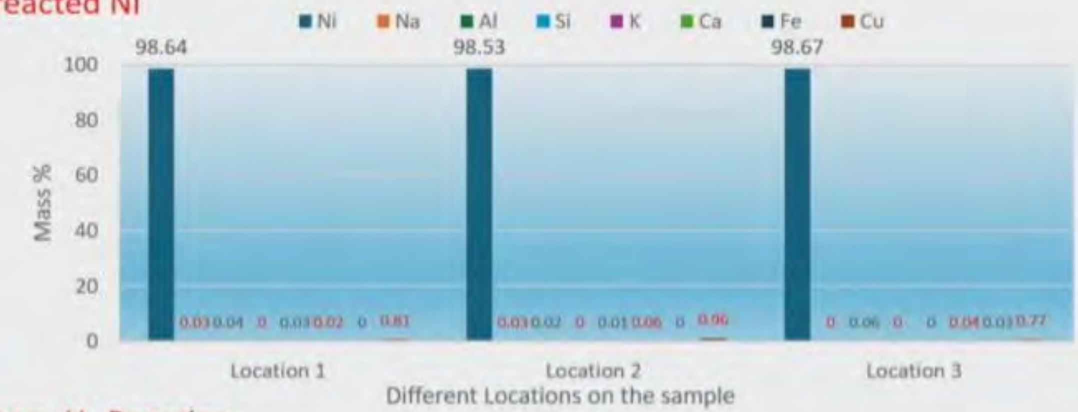
Elements	Pt-Ni	Gr-Ni
Fe	3.0% - 6.0%	2.0% – 5.0%
Mg	1.0% - 4.0%	1.0% - 2.0%
Cr	0.5% - 2.5%	0.5% - 0.9%
Zn	1.0% – 2.5%	No yield
Ce	No yield	2.0% - 4.0%

- Zn detected on Ni in Pt Anode only
- Ce produced on Ni in Gr anode and it's a Fusion product.

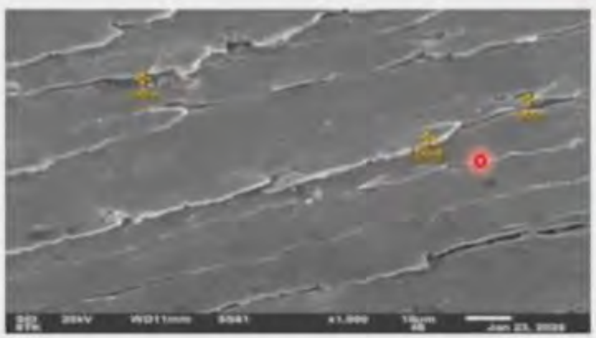
EDX analysis of Pure Ni and reacted Ni sample

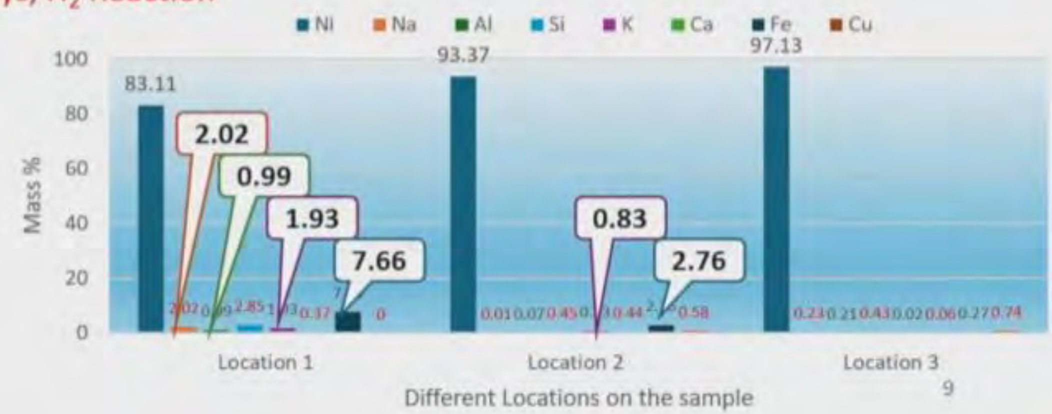
Unreacted Ni





After 50 days, H_2 Reaction





9

(Gas Loading)

Other metals and alloys in gas loading

- ✓ Ti wire: no new elements.
- ✓ Kanthal wire : very less amount of K(0.91) is found only at one point.
- ✓ Pd wire: Ag (1.17) only at one point.
- ✓ Pt wire: No transmutation occurs.
- ✓ Constantan wire: at some location, Al and Fe are present.

Conclusions

- Light water electrolysis of Ni generates Fe, Mg, Cr, Zn, when a Pt anode is used.
- Light water electrolysis of Ni generates Fe, Mg, Ce, in significant amounts, but Cr is very little, and Zn is absent, when a Gr anode is used.
- Elemental transmutation is slightly dependent on the anode material.
- Ni isotopic composition remained unchanged after light water electrolysis.
- Significant decrease in $^{52}Cr/^{50}Cr$ ratio observed in reacted samples.
- In the H_2 gas environment experiment, mainly Fe, Na, K, and Al are new elements found in Ni.
- These elements were predominantly found at cracks or pits, though not at all such locations.

Постерные сессии

- QR –> короткие видео
- Реально постеров висело около половины

Биологическая трансмутация

- V. Vysotskii, A. Kornilova, S. Gaydamaka. The Biophysical Reasons, Physical Mechanism and Experimental Implementation of Iodine to Xenon Transmutation in Biological Systems
- J. Fahrentrapp, E. Wohlleben. Element Concentration Changes in Biological Material

Alan Smith, Lynn Bowen. Research Funding via ISCMNS Project Pathway and LENR-DAO

Introduction and an Announcement

- Over the last several months ISCMNS CEO Alan Smith and ISCMNS President Lynn Bowen have been successful in securing pledges from interested investors to fund research into LENR systems.
- These funds are to be used to finance projects submitted by members of the ISCMNS, the SFSNMC, and/or the JCFS.
- We are asking interested parties to submit a plan for an experimental research project related to LENR.

- A **Request for Proposals** asks members to describe an experimental research project that you would like to do.
- **What experimental research would you, and/or a group of your associates, like to do if you were given funds?**
- A panel of members, (representing all three societies) will decide on which of these proposals is to be granted funds--from one to four projects.
- If we select only one project, that project would be a collaborative effort.

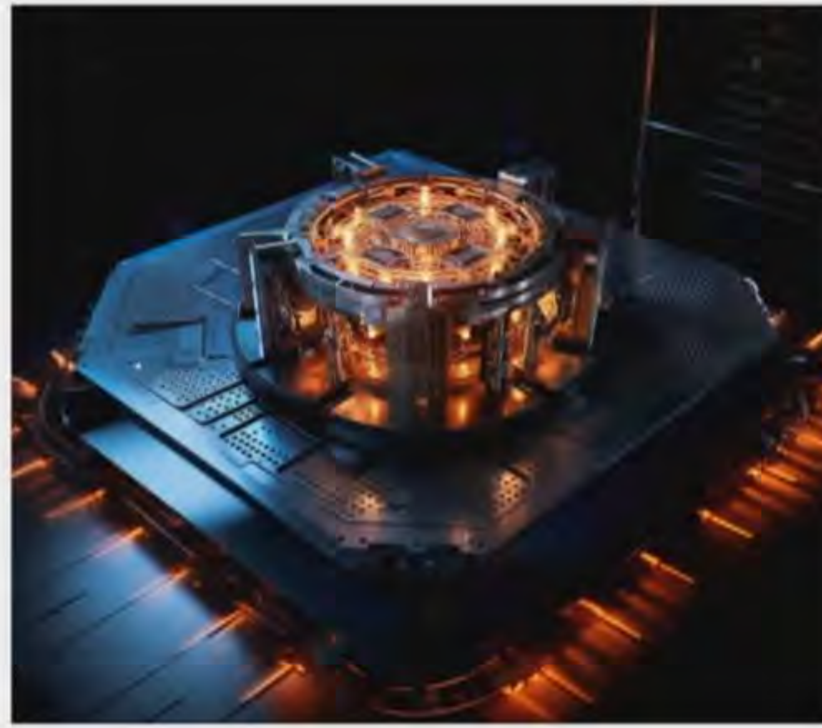
More Details

- All funded projects will be the subject of one or more video documentaries, shot on site of the research.
- Research progress will be monitored by the panel, through the submission of progress reports. The funding will be distributed on a time scale, if the reports show satisfactory efforts.

- The ISCMNS will not retain any commercial interest in the research Intellectual Property.
- However, the funding benefactors retain the right to ask sensitive questions.
- The hope is that they will use the preliminary findings from this project as a **springboard** for more innovation and more investment.

The Request for LENR Research Proposals

- The Request for Proposals is OPEN NOW! See the link for this Request for Proposals (RFP) on the web sites.
- This Request for Proposals form is available to all members of the JCFS, SFSNMC, and ISCMNS.
- Fill out this form and submit your idea for an **experimental LENR research project**.
- Your short proposal should describe an experimental research project for the panel to consider.
- The research would be done by the researcher submitting the proposal.



Selection Method for Projects Receiving Funds

A panel of members will choose which proposals is to be granted the funds, from one to four projects.

Criteria for selection of the proposals are as follows:

- The research is focussed on LENR systems and phenomena.
- It must have commercial potential and describe a possible commercial application.
- Or, at least, it should describe a possible **pathway** to advance the science of LENR, to achieve future commercial applications.
- The objective is to demonstrate that LENR is a real, investable, and useful technology.

Publicity.

- There will be a video of each project.
- This will be financed by 20% of the total Project Pathway budget.
  - Social media.
  - YouTube.
  - Other available and credible on-line publicity sites.
- Published papers showing the results of the research are strongly encouraged.
- We want to publish any <u>positive results</u>, not only in the JCMNS, but in other journals as well.
- No bad publicity.

Timescale.

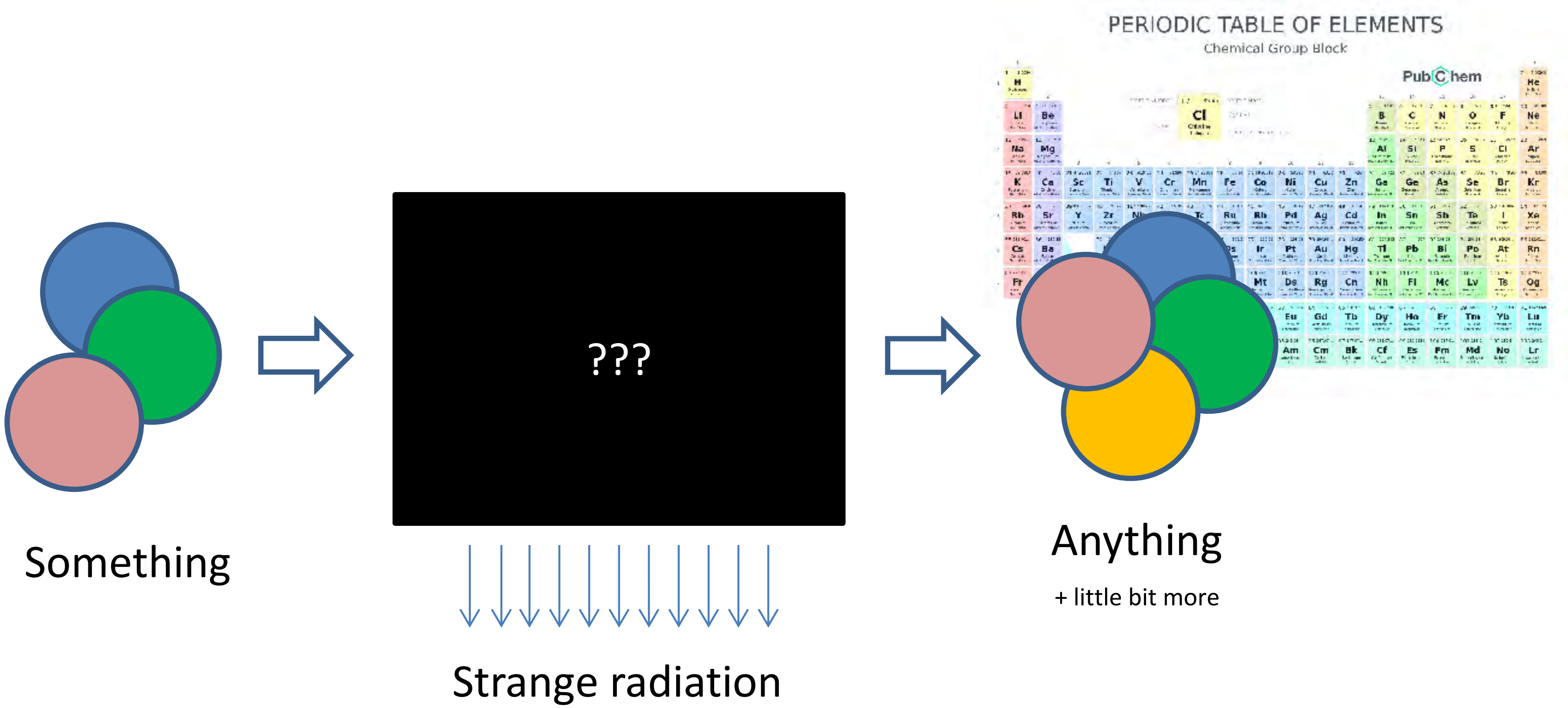
1. We send out the Request for Proposals.
2. We give the experimental researchers two months after step 2 to produce and submit a proposal.
3. The panel will spend one month, after step 3, deciding what research proposals to fund.
4. We announce the successful projects one day after step 4.
5. We pay out 50% of the forecast total project cost at this point to the successful researchers.

6. Researchers have a maximum of 12 months from the planned start date and the issue of the first portion of funds to finish the programme of work they proposed, and to submit the final report and accounts.
7. If requested, a time extension can be given. (There is no time extension for the interim report.) No extra funds will be given for a time extension.
8. After we approve the report and financial accounts, we pay the researchers the second half of the funds within 1 week after acceptance of their report.
9. Project Pathway officially ends.

Разговоры и встречи

- «Я им не доверяю» (о результатах без водорода)
- «Наука это не только наука» (о психологии, социологии, политике и финансировании)
- «Я посчитала только вариант с электролизом» (об отсутствии нейтронов)
- «LENR идёт из-за кавитации. Что происходит когда нет кавитации? Я не знаю»
- «Ваш дедушка занимался холодным ядерным синтезом»
- GitHub для LENR

LENR is...



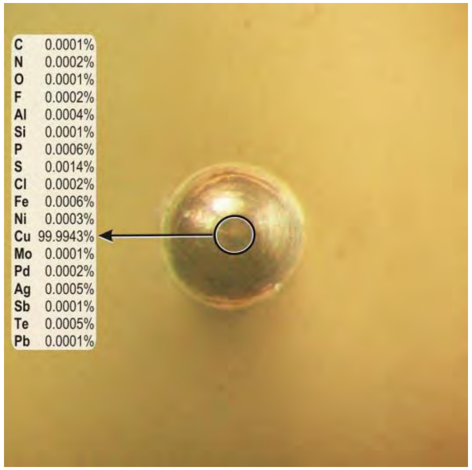
Parkhomov A.G., Belousova E.O. Huge Variety of Nuclides that Arise in the LENR Processes. Attempt at Explanation. Journal of Modern Physics, Vol.13, No.3, March 2022

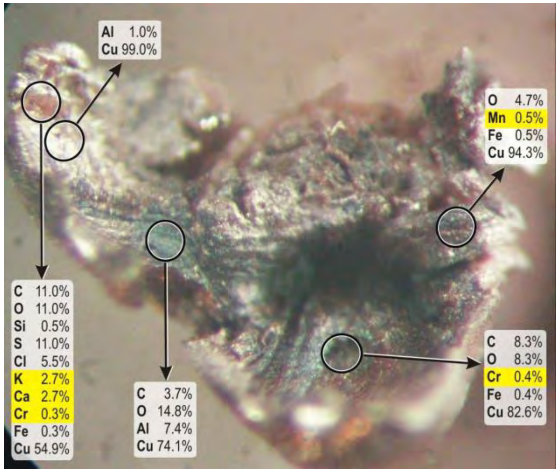
Ключевые загадки LENR

- Происходят при относительно небольших температурах
- Продукты нерадиоактивны
- На входе – не только лёгкие элементы
- На выходе – полтаблицы Менделеева
- Нет гаммы и нейтронов (почти)
- Странное излучение

Основная загадка

- Как реагируют между собой атомы на расстояниях порядка постоянной кристаллической решётки?
- Примеры:

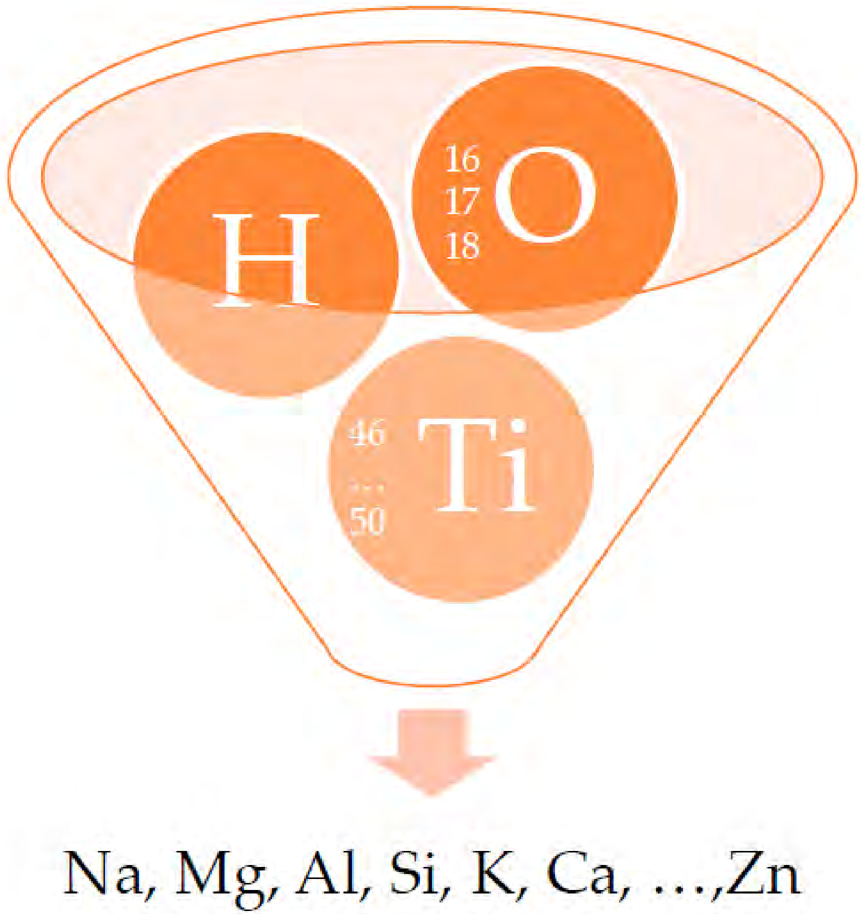




Результаты экспериментов по инициированию коллективных ядерных реакций в сверхплотном веществе https://proton-21fusion.com/publ/Booklet_ru.pdf

Основные сложности

- Модель явления не ясна
- Узкое рассмотрение проблемы (D+D: поиск под фонарём)
- Игнорирование фактов
- Не хватает «безумных» идей или они не принимаются во внимание
- Компании не делятся результатами
- Слабое финансирование



Л.И. Уруцкоев. О коллективном характере физического механизма поведения НЭЯР // Доклад на РКХТЯиШМ-25

Следующая конференция

Dimiter Alexandrov, Lakehead University, Canada

Спасибо!

https://iccf26.org

II.

Обзор докладов на международной конференции ICCF26

Часть 1. "Что нового и важного в трудах конференции ICCF 26????"

Анатолий Иванович Климов

д.ф.-м.н.,в.н.с. ОИВТ РАН, Москва

Введение. Организационно- политические аспекты. Взгляд со стороны...

https://prtimes-jp.translate.goog/main/html/rd/p/000000001.000161439.html?_x_tr_sl=ja&_x_tr_tl=en&_x_tr_hl=fi&_x_tr_pto=wapp&_x_tr_hist=true

Успешно разработан прототип печи холодного синтеза. Реализован источник тепла мощностью 2000 Вт при потребляемой мощности 400 Вт.

Высокоэффективный, экологически чистый источник тепла, способный непрерывно работать в течение 10 лет на одной зарядке водорода - японская энергетическая технология следующего поколения, которая будет применена на практике в 2027 году.

Cool Fusion Co., Ltd.
1 Мая 2025 года, 11:38 утра

"Тепловой модуль № 1" демонстрирует стабильную работу в течение пяти месяцев

Необходимость коммерческого внедрения LENR технологий - основной вывод конференции ICCF_26

Main Stream of LENR's Commercialization Technologies

2025

Mizuno's LENR Reactor

The 26th International Conference on Condensed Matter Nuclear Science

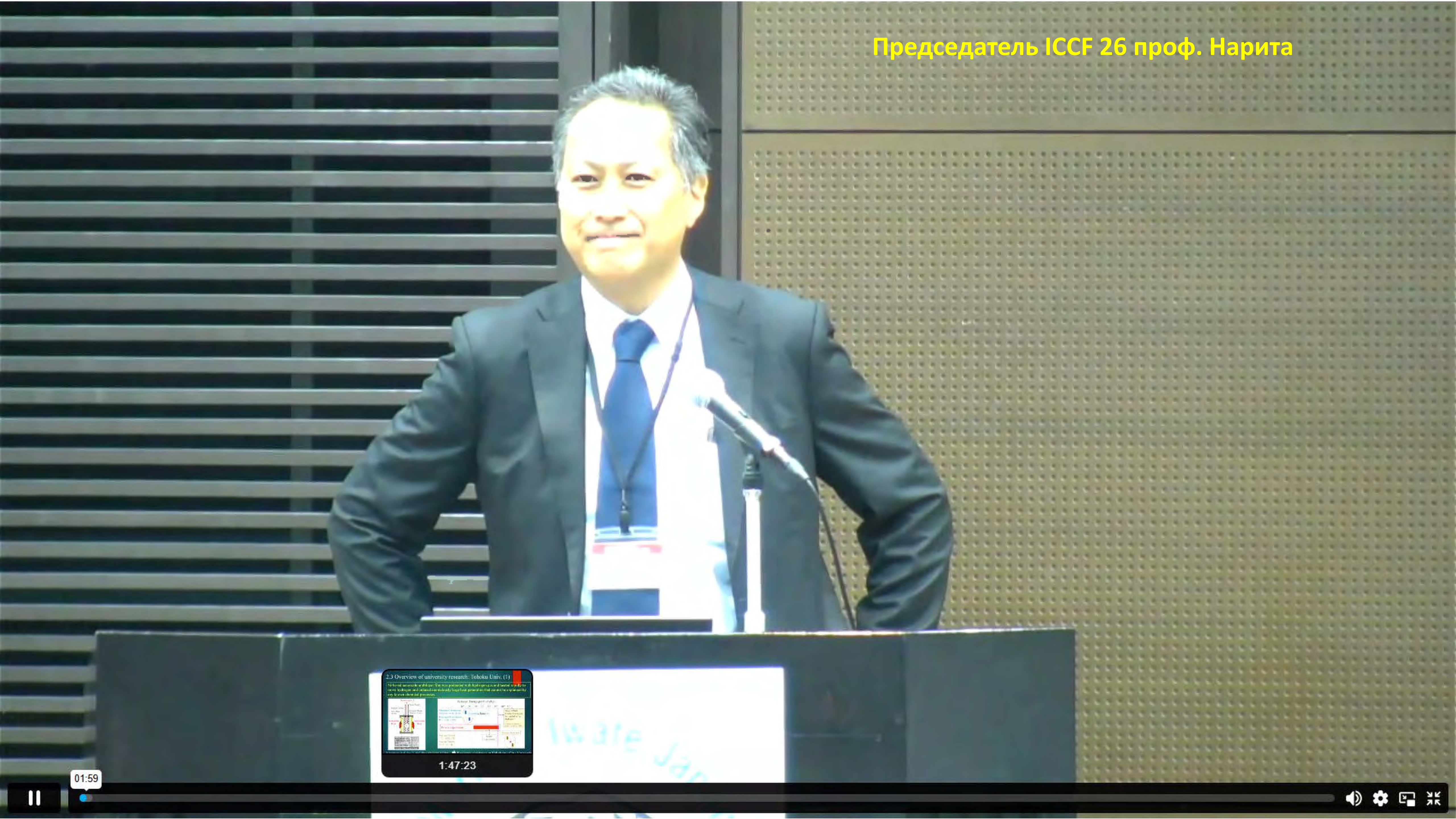
26-30 May Aiina, Morioka, Japan

Group Photo @ 4F / Aiina , 2025.5.26(mon)

Photo by Satomi Fujisaki (LOC /Iwate-Univ.)


MORIOKA
00:06


MORIOKA
00:10


Председатель ICCF 26 проф. Нарита
2.3 Overview of university research: Tohoku Univ. (1)
1:47:23
01:59

1990 Salt Lake City, Utah, U.S.
1991 Como, Italy
1992 Nagoya, Japan
1993 Lahaina, Maui, U.S.
1995 Monte Carlo, Monaco
1996 Hokkaido, Japan
1998 Vancouver, Canada
2000 Lerici (La Spezia), Italy
2002 Beijing, China
2003 Cambridge, Massachusetts, U.S.
2004 Marseille, France
2005 Yokohama, Japan
2007 Sochi, Russia
2008 Washington DC, U.S.
2009 Rome, Italy
2011 Chennai, India
2012 Daejeon, South Korea
2013 Columbia, Missouri, U.S.
2015 Padua, Italy
2016 Sendai, Miyagi, Japan
2018 Fort Collins, CO, U.S.
2019 Assisi, Italy
2021 Xiamen University, Fujian, China
2022 Mountain View, CA, U.S.
2023 Szczecin, Poland

ICCF20

ICCF returns to Japan

~ 130 in person

~ 30 virtually

Acknowledgements

Main Sponsor

Anthropocene Institute

Solid State Fusion

INFINITE ENERGY

IH

Sponsors

熱・電気エネルギー技術財団

The Thermal & Electric Energy Technology Inc. Foundation

mtca

JCF

IWATE ILC PROMOTION COUNCIL

clean planet

NHFE.

With Gratitude to Our Individual Donors

Huw Price

Alan Smith

Shane Daigle

Tom Grimshaw

David Fojt

Robert Fickle

Jed Rothwell

Christophe La Roux

Giovanna Bassani

Jacques Ruer

Klaus Rottach

Alexander Rieder

Haslen Back

N. Lynn Bowen

and

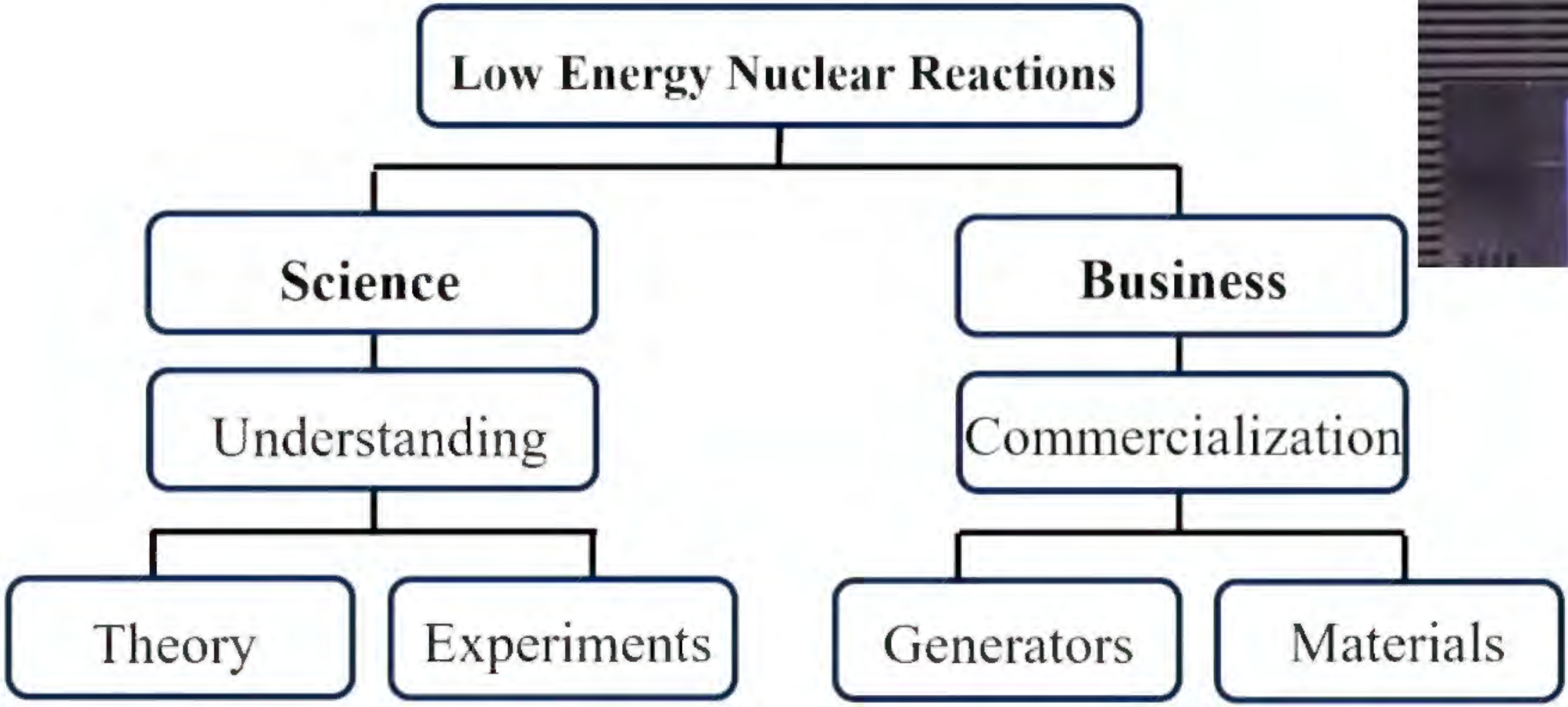
Two anonymous donors

09:02

Обзор исследований в области LENR в США. Проф. Д. Нагель

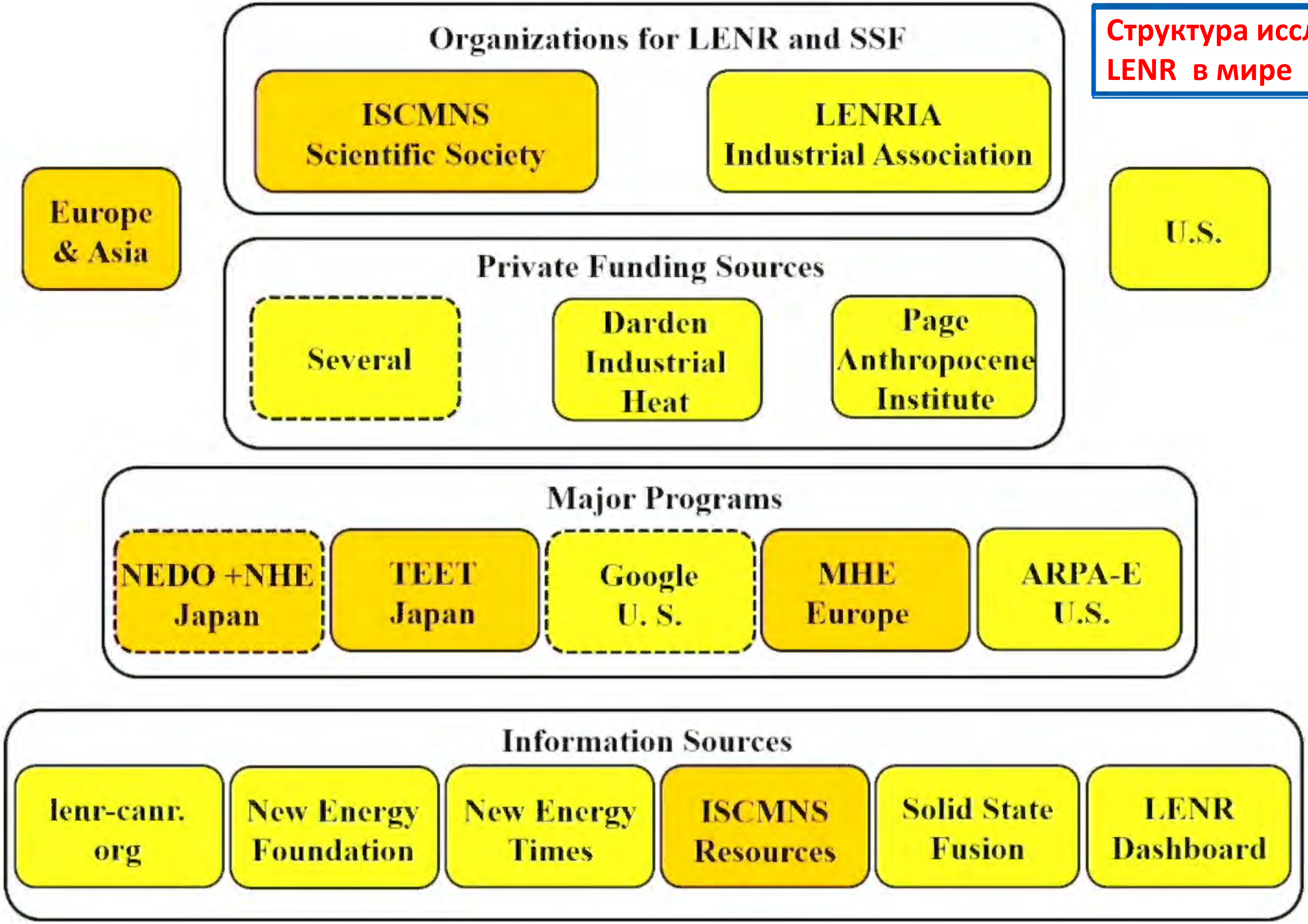
Overview of LENR in the United States

David J. Nagel
George Washington University
nagel@gwu.edu



10:47

Структура исследований LENR в мире



Recent and Current
Theoretical LENR Research in the U.S.

Важнейшие теоретические исследования по LENR в США

Pre-2015: Kim, Widom, Larsen and a Few Others

Mark Davidson
Spectel Research Corporation
Lead-authored paper in 2016

Andrew Meulenberg
Science for Humanity Trust, Inc.
19 lead-authored (32 co-authored) papers from 1990 to 2022

Peter Hagelstein
MIT
88 lead-authored (124 co-authored) papers from 1989 to 2025
“Progress on a Model for Anomalies in Condensed Matter Nuclear Science”

Private Funding Sources in the U.S.

Частные источники финансирования в США

A Few Individuals:
Many Years of Funding

Thomas Darden

?????

Dewey Weaver
Industrial Heat
dewey.weaver@deeprv.com

Carl Page
Frank Ling
Anthropocene Institute
frank@anthinst.org

Play

14:36

Google Program (2015-2019)

Lessons learned from Project Charleston

Matt Trevithick

October 22, 2021

ARPA-E Low-Energy Nuclear Reactions Workshop

mtrevithick@google.com

List of Publications: https://groups.chem.ubc.ca/cberling/charleston/

https://arpa-e.energy.gov/sites/default/files/migrated/2021LENR_workshop_Trevithick.pdf

LENR Research in the United States

Florian Metzler MIT (2024)

https://www.youtube.com/watch?v=dpGy60aVsNE

Список призеров
в конкурсе Проектов
по LENR в рамках
Программы
ARPA- E

ARPA-E LENR Program

U.S. Department of Energy Announced $10 Million in Funding to Projects Studying Low-Energy Nuclear Reactions.

17 February 2023

Energetics Technology Center	Pd-D Co-Deposition onto Coated Radiation Detectors
MIT	Radiation Measurements from Gas-Loaded Metal-Hydrogen Systems.
Stanford University	Radiation Measurements from LENR-Active Nanoparticles & D_2 Gas
University of Michigan	D_2 Cycled through a Chamber Filled with Palladium Nanocrystals
Amphionic LLC	Development of Nano-Materials for LENR
Lawrence Berkeley Nat'l. Lab.	Nucl. Radiation Measurements from Energetic Beams onto Deuterides
Texas Tech University	Advanced Materials Fabrication, Characterization, and Analysis
University of Michigan	Neutron, Gamma, and Ion Emissions from LENR Experiments

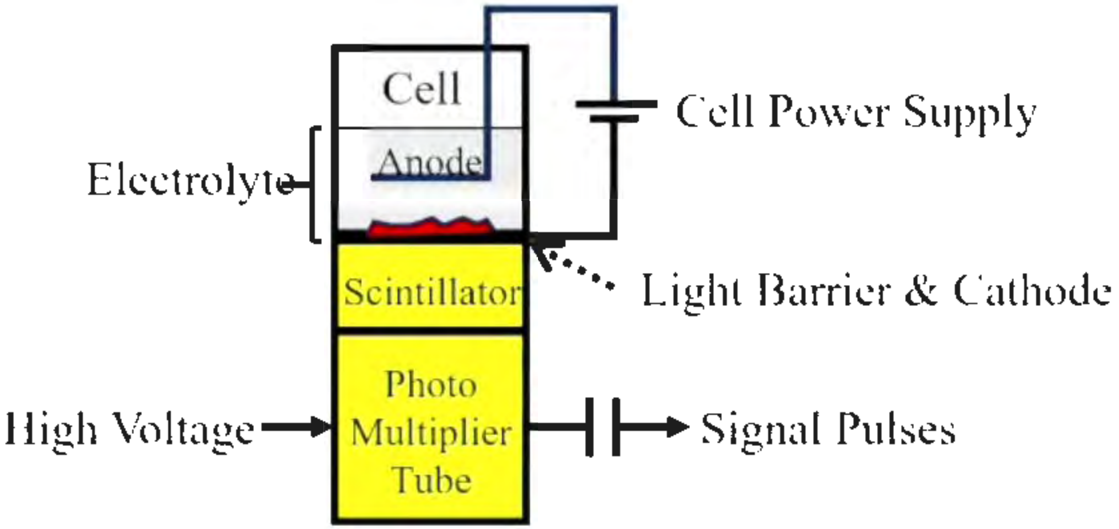
https://arpa-e.energy.gov/sites/default/files/2025-01/Project%20Descriptions_LENR.pdf

CATHODE (CATHode scintillat Or Detector for Electrochemistry)

Energetics Technology Center ($1,500,000)

Naval Research Laboratory (Sub-Contractor)

Energetics Technology Center will build upon past successes with **co-deposition experiments** using palladium, lithium, and heavy water together to create an environment in which LENR can occur. **These electrolysis experiments decrease the distance from the cathode (location of LENR) to an electronic detector** capable of detecting nuclear reaction products **to give these experiments the best chance at reliably detecting nuclear reactions**, if they are present.



Systematic Evaluation of Claims of Excess Heat Generation from Deuteration of Palladium-Nickel Nanocomposites

University of Michigan ($1,108,412)

The University of Michigan proposes to systematically evaluate claims of excess heat generation during deuteration and correlate it to nuclear and chemical reaction products. The team plans to **combine scintillation-based neutron and gamma ray detectors, mass spectrometers, a calorimeter capable of performing microwatt-resolution measurements of heat generation, and *ab-initio* computational approaches.** The proposed research will experimentally and theoretically explore the origin and mechanisms of excess heat generation and LENR.

Nanostructured Pd-Anf Composites for Controlled LENR Exploitation

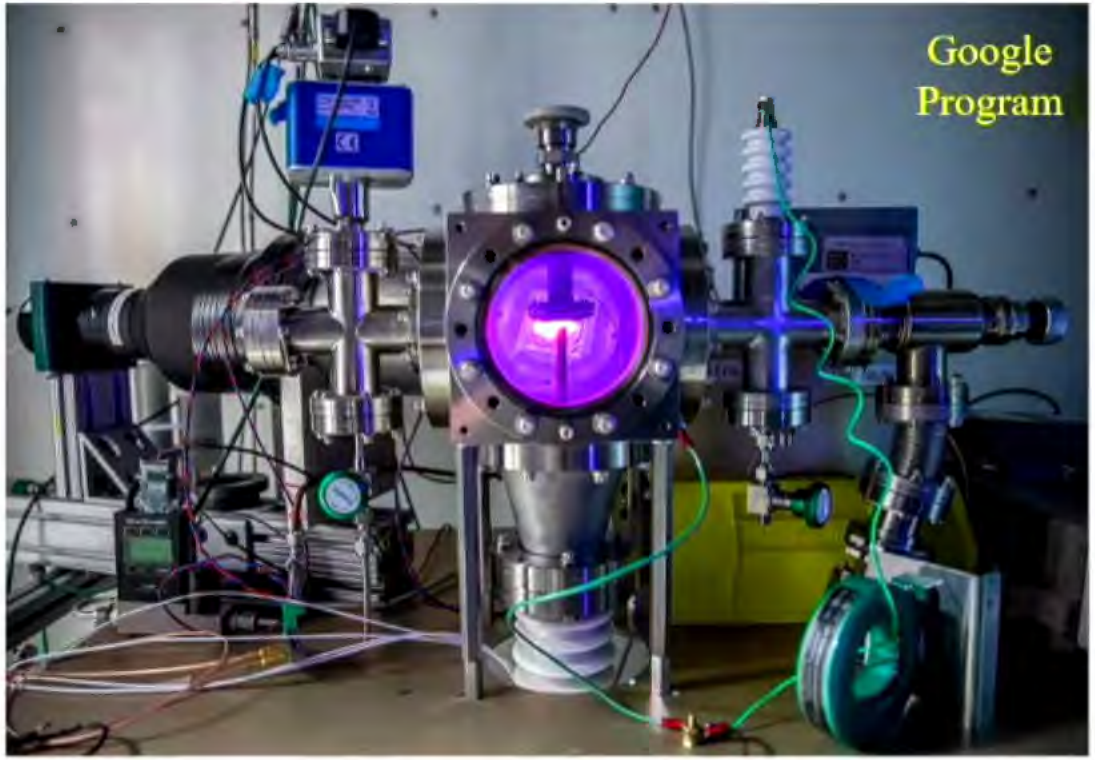
Amphionic LLC ($295,924)

Cathode structure and surface morphology are thought to be essential for LENR reaction rate. Amphionic proposes to **optimize cathode design to form Pd-polymeric composites within which the Pd nanoparticle size and shape are varied, and the interfacial separation and geometry are controlled**. Experiments will focus on exploring if LENR are produced in potential wells existing between two nanoscale surfaces by controlling metal nanoparticle geometry, separation, composition, and deuterium loading.

Quantifying Nuclear Reactions in Metal Hydrides at Low Energies

Lawrence Berkeley National Laboratory ($1,500,000)
University of California Davis

LBNL team proposes to probe for LENR at **external excitation energies below 500 eV**, systematically varying materials and conditions while monitoring nuclear event rates with a **suite of diagnostics**. The team will draw from knowledge based on previous work using higher energy ion beams as an external excitation source for LENR on **metal hydrides electrochemically loaded with deuterium.**



Electrochemical loading and low-energy beam excitation.

Supporting Projects

Advanced Materials Characterization & Nuclear Product Detection for LENR

Texas Tech University ($1,150,000)

Texas Tech University will **develop accurate materials fabrication, characterization, and analysis** to attempt to resolve the physical understanding of Low-Energy Nuclear Reactions (LENR). Texas Tech will also provide **advanced detection of nuclear reaction products** as a resource for ARPA-E LENR Exploratory Topic teams

Ionizing Radiation Detection for Exploratory Experiments in Low-Energy Nuclear Reactions

University of Michigan ($902,213)

University of Michigan will provide capability to **measure hypothetical neutron, gamma, and ion emissions from LENR experiments.** Modern instrumentation will be coupled with best practices in data acquisition, analysis, and understanding of backgrounds to interpret collected data and evaluate the proposed signal.

Other U. S. Labs Doing LENR Experiments

Другие ведущие Лаборатории США, работающие в области LENR

Mitchell Swartz
Jet Energy, Inc.
mica@theworld.com
Electrochemical and NANOR™ Experiments

Francis Tanzella
Energy Research Center
consulting@tanzella.name
Ni/H_2 Fast Pulse and Other Experiments

Thomas Claytor
Ferme Technology
claytor@att.net
Ultrasonic cavitation in D_2O on a variety of metal and metal alloy samples.
Plasma nano alloy powder generation and testing.

Frank Gordon and Harper Whitehouse
InovL, Inc.
fgordon4@outlook.com

22:07
22:09

LENR Companies

Clean Planet
Japan

ENG8
Portugal

HYLENR
India

Thailand

METATRON N.R.G. Ltd.
Israel

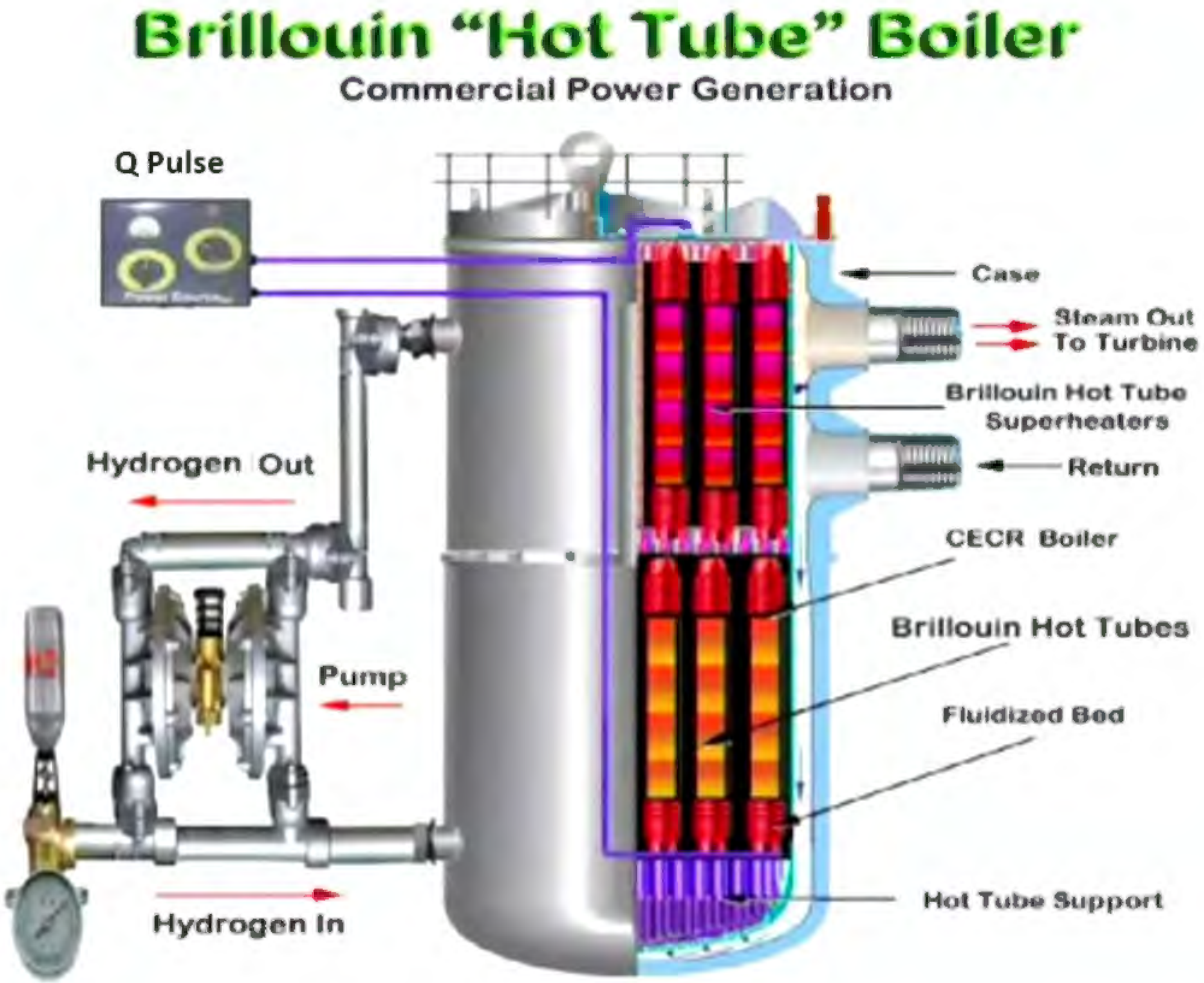
?????

E-Cat
The New Fire

Brillouin Energy
USA

Leonardo
Corporation
USA

Brillouin Energy



https://brillouinenergy.com/

Leonardo Corporation

Two Concerns:

Rossi has a complex history in both Italy and the U. S., and Recent videos from Rossi state that the energy source is Zero Point Energy, and not Nuclear Reactions

https://ecatthenewfire.com/

https://e-catworld.com/2025/02/01/another-unlimited-range-car-claim

https://e-catworld.com/2025/02/17/e-cat-pre-order-prices-dropped-rossi-promises-e-cat-delivery-in-2025/

https://e-catworld.com/2025/03/04/video-e-cat-world-update/

https://e-catworld.com/2025/03/23/2025-is-shaping-up-to-be-a-critical-e-cat-year/#google_vignette

https://e-catworld.com/2025/04/03/engineering-at-the-quantum-scale-with-the-e-cat-calle-h/

https://e-catworld.com/2025/04/16/a-vision-for-tesla-a-model-y-without-limits-lenr-wiki/#google_vignette

https://e-catworld.com/2025/05/01/rossi-important-developments-happening-this-week/#google_vignette

https://e-catworld.com/2025/05/07/reaction-to-rossis-may-7th-status-report/

https://www.youtube.com/@ecatthenewfire

Development of Materials for Low Energy Nuclear Reaction (LENR) Scientific Experiments & Commercial Generators

David J. Nagel, M. Ashraf Imam and Emanuele F. Marano
George Washington University

Программа исследований рабочих материалов для LENR реакторов

Effective materials enable the production of LENR and produce some of their desirable characteristics.

Realizing the potential of LENR energy requires mastering the ability to both produce and maintain effective materials.

The situation is similar to semiconductor electronics!

24:59

Thorough Past LENR Materials Research Program:

Violante and other scientists performed a thorough materials
and LENR research program using Pd and PdRh Alloys.

They modified the materials and studied them with these methods:
Scanning Electron Microscopy, Atomic Force Microscopy,
and Energy Dispersive X-Ray Chemical Analyses.
Then, they performed calorimetry on electrochemical LENR experiments
with the well-characterized materials.

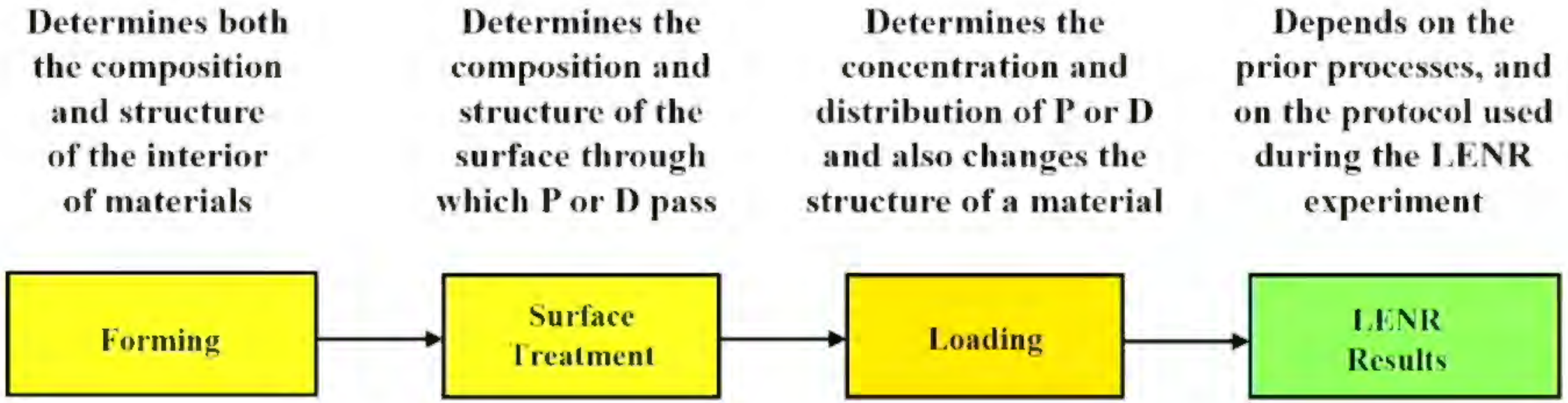
They concluded that the probability of excess heat is enhanced when three conditions are met:
(1) Loading is easy at a relatively low current density due to proper metallurgy.
(2) The surface has the appropriate texture, mainly a <100> crystal orientation.
(3) The surface morphology from Atomic Force Microscopy is in a good range.

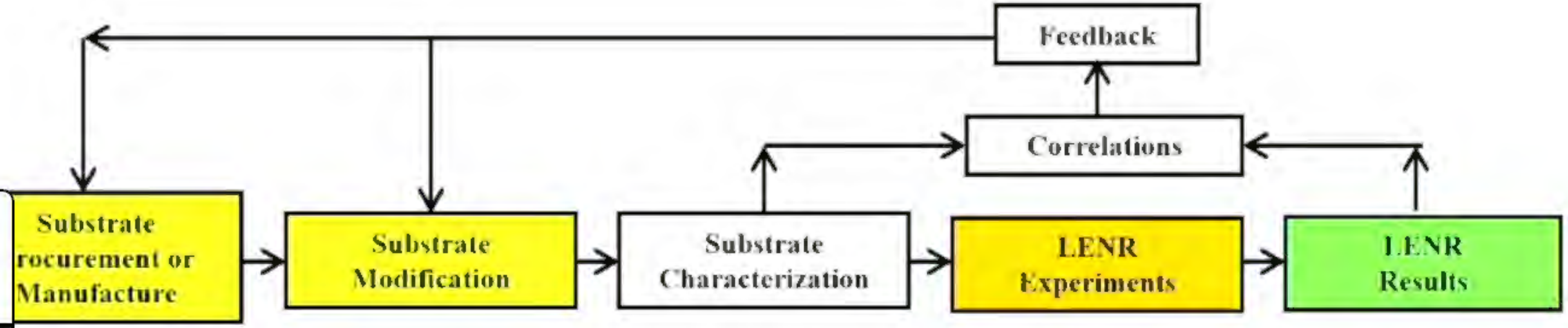
V. Violante *et al.*, "Material Science on Pd-D System to Study the Occurrence of Excess Power"
In Proceedings of ICCF-14 (Editor: D. J Nagel *et al.*,) pp. 429-436 (2008)

Violante and 16 other scientists continued the thorough materials
and LENR research program using Pd and PdRh Alloys
with the above methods and Electrical Impedance Spectroscopy.

iolante *et al.*, "Excess Power during Electrochemical Loading: Materials, Electrochemical Conditions & Techniques",

LENR Materials Research





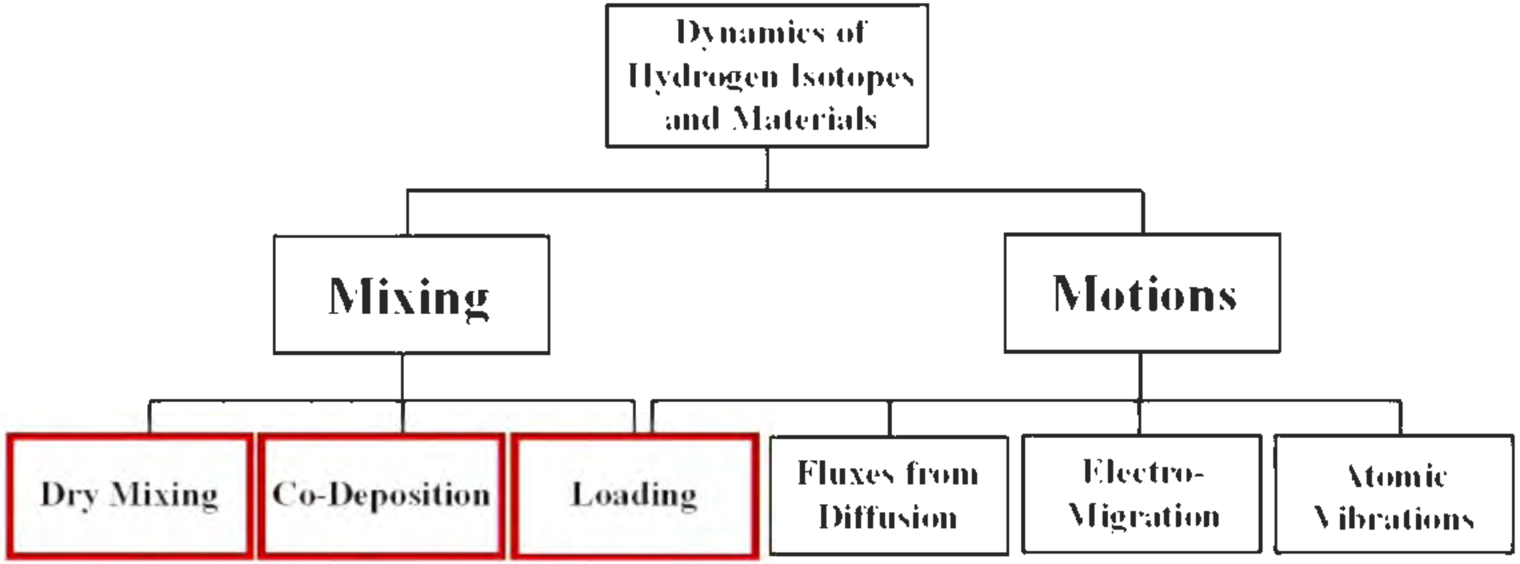
Production of LENR Materials

Materials for LENR experiments have been obtained in three ways:

In one, some materials are procured and possibly modified prior to **loading** of protons or deuterons into them.

In the second method, called **co-deposition**, the materials and hydrogen isotopes are simultaneously electrochemically deposited on a substrate.

The third method involves **dry mixing** of the materials prior to operation.



Diffusion is good (protons and deuterons) and maybe bad (metal atoms).

Testing of Materials for LENR

The most important property of materials
for production of LENR energy
is their ability to produce **output power at high levels**.
The second most important property is their **durability**.

These properties can only be determined by testing the materials
in experiments with suitable excitation.

**Three methods of loading and excitation
have been found to produce LENR:
electrochemical cells, hot gas, or plasmas.**

The materials produced in this program
will be tested with each of these approaches.

Hot Fusion Companies

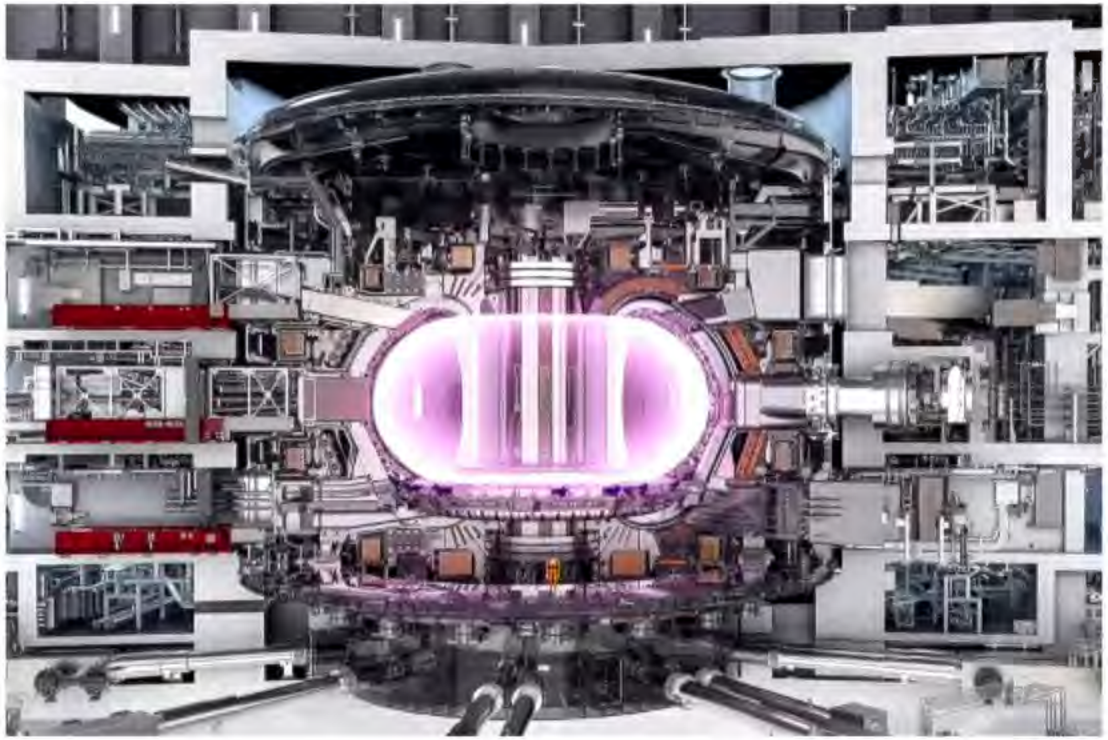
Сравнение Программ холодного и горячего синтеза

31:23

31:25

Hot Fusion vs Cold Fusion = LENR = SSF

Tens of **Billions** of $.
Immense Power Plants



100 Million Degrees
Significant Radioactive Waste
Megawatt Power Levels
Need Grid Distribution

Tens of **Millions** of $.
The size of a Desk!

Few Hundred Degrees °C
Little Radioactive Waste
Kilowatt Power Levels
Widely Distributed

LENR Information Sources

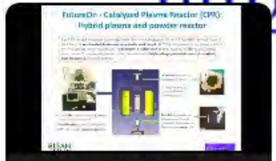
https://lenr-canr.org/wordpress/?page_id=1081

https://www.infinite-energy.com/resources/links.html

https://newenergytimes.com

https://iscmns.org/papers

https://solidstatefusion.org/articles/



https://lenrdashboard.com (EXPLORE tab)

THE LENR OUTLIERS

There are at least 6 companies globally working on different aspects of plasma fusion (or in one case Mizuno-fusion) that are currently claiming to have, are approaching or seeking commercial partners –these include:-

- BIACO
- HYLENR
- FUTURE ON
- ENG8
- ?
- META-TRON

All propose small, modular energy sources good for off-grid use .
Emphasising decentralisation, zero-CO2 and energy supply security.

Alan Smit

Обзор основных достижений в LENR физике. Взгляд со стороны Президента IWAHLM…

THIS IS A DIGRESSION

This is one thing we can do - We are viewed by mainstream science as a secretive, eccentric cabal. We need to talk more to people outside our field, rather than just those who work in LENR since they often face the same problems of funding and acceptance of ideas that we do.

In pursuit of this we are planning IWAHLM-17 right now, on mid-October at a location not a million miles from Paris. Arras is in the heart of France's battery giga-factory cluster, and we hope to bring along people from that- in many ways related - field of condensed matter science to share their ideas and discoveries.

DIGRESSION OVER!

LENR IS ATTRACTING ATTENTION
BUT
IT NEEDS TO ATTRACT FUNDING TOO.

As our colleague and friend David Nagel has pointed out there are 'push and pull' factors that are increasing acceptance of cold fusion. The 'push' comes from the fact that our civilisation is down a hole and still digging for energy, while simultaneously ignoring what we are doing to our only home. We are nightmare tenants, burning the furniture and the floorboards and wondering why the house is unusable. We know we need to do better.

The pull has a number of attractive elements, firstly the angelic side of human nature, sometimes found on the darkest capitalist heart, perhaps more so now than for over 100 years. This benevolence is in part because of advances in LENR research and also the magical attraction of the word 'fusion'. This could lead to a new industrial revolution - if we create it.

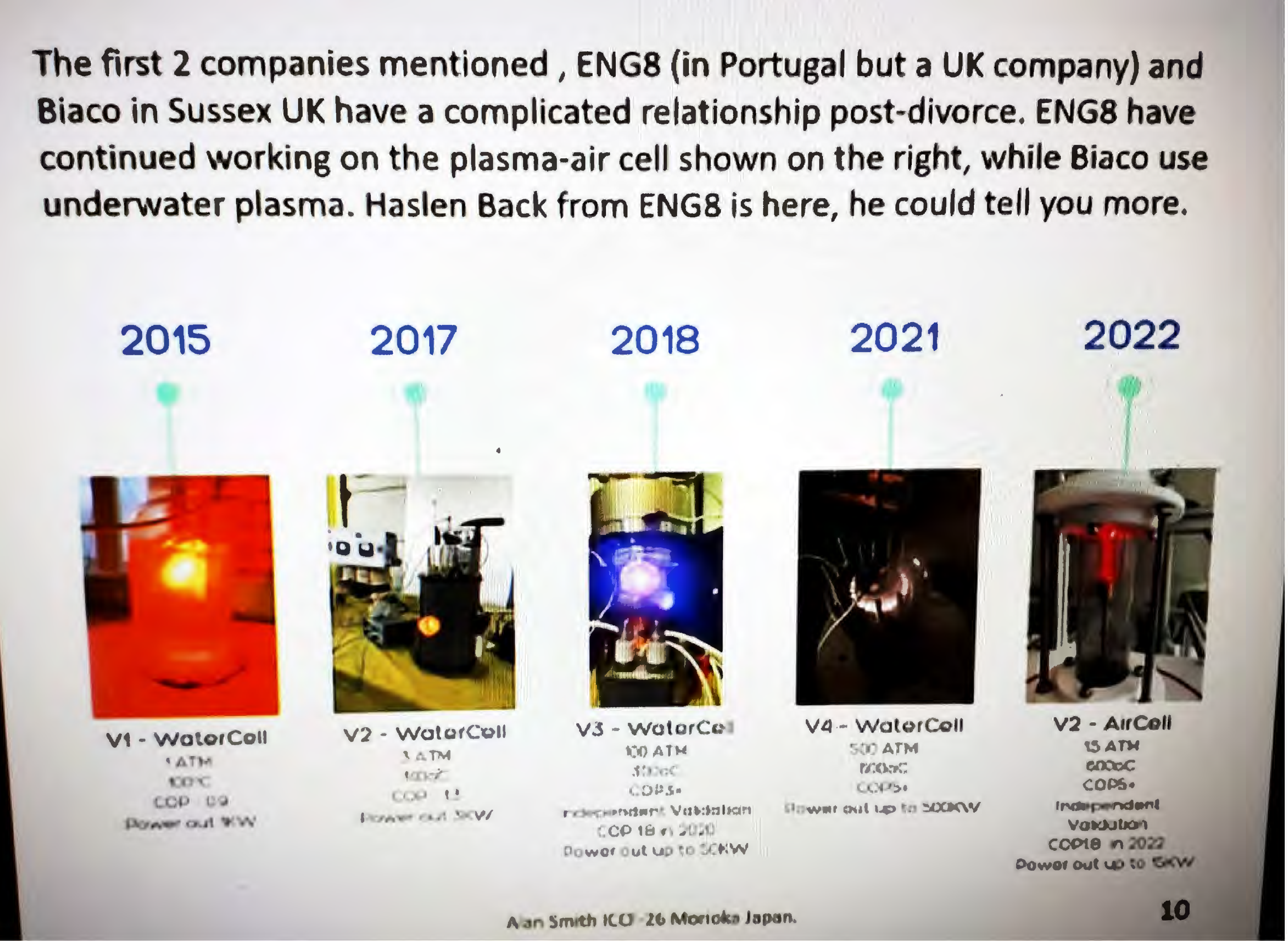
The pull also has a demonic side, those who, to quote Mark Twain, see LENR as a gold mine, even if they think of it merely as 'a hole in the ground with a fool at the top'.

Пристальное внимание к LENR сегодня,
но……
Недостаточное финансирование работ в области LENR….

Компания ENG8

Динамика достижений

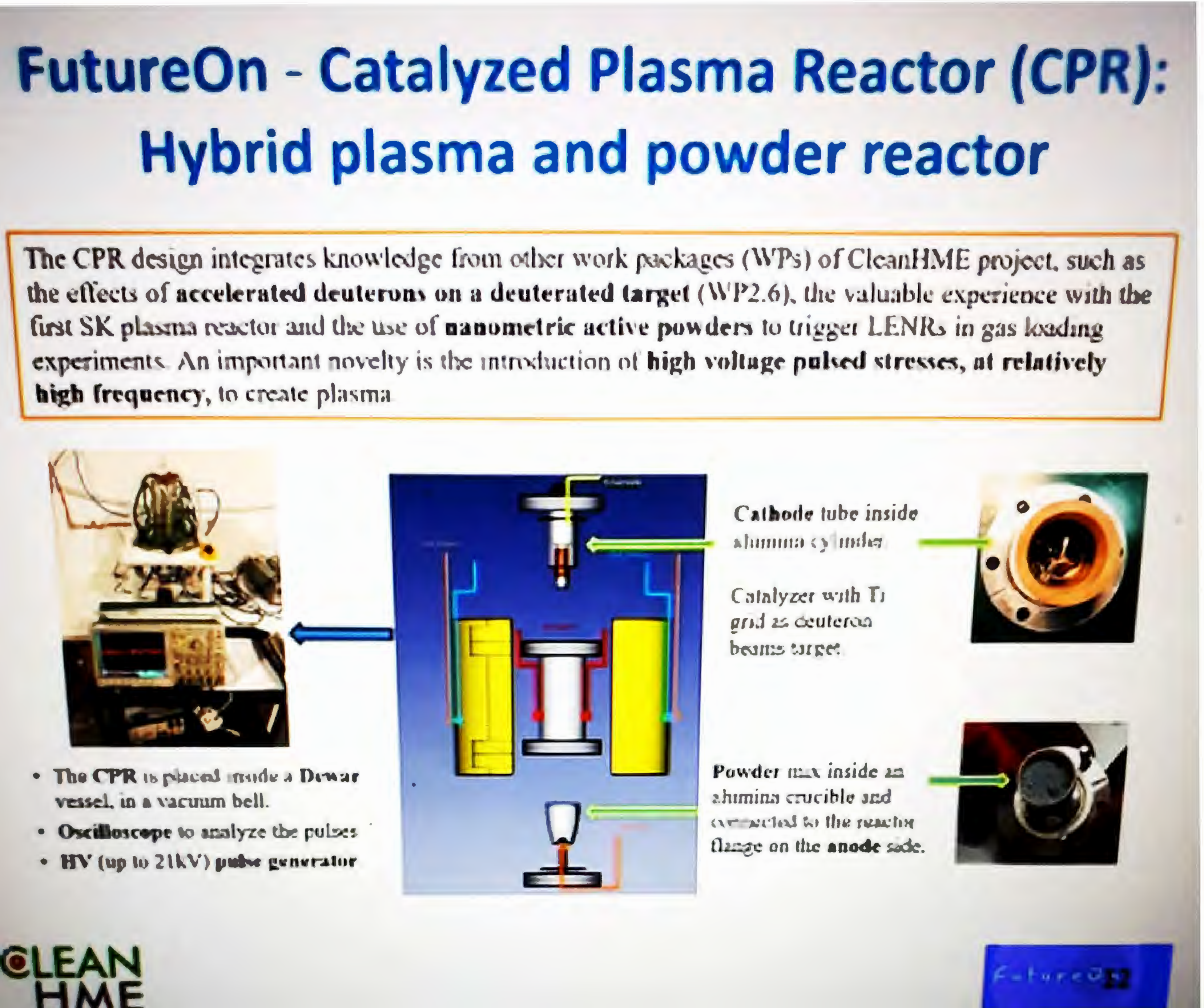
Основные этапы развития



THE LATEST ENG8 AIR-CELL

This is the latest version of the gliding arc air-plasma cell. The plasma is confined by a vortex created by injecting high velocity air at an angle close to the inside wall of the reactor. The air flow spirals neatly to the bottom of the device where it is deflected and returns up to the exit point heated by the arc on its way A vortex inside a vortex, neat and elegant.

Haslen confirmed ENG8 is preparing to supply industrial heat to nearby customers and expects commercial deployment within the next 12 months. Haslen claims a COP of 3+ EnergiCell platforms are modular and scalable, from 10W micro-units designed to run laptops, up to 100kW systems capable of running steam generators for industrial use including a major chemical facility. Currently ENG8 also support the work of George Egely (also present) who has been developing small (for now) 'sparks in Hydrogen' systems that produce direct electricity. Tests look very promising.



Компания FutureOn

Италия

Динамика достижений

Основные этапы развития

FUTUREON SRL, GUIDO PARCHI, BOLOGNA, ITALY

This has been part of the EU-funded Clean HME project, Two different promising prototypes are currently under development, STR & SSFER reactors (Gas loading & HV discharges). They are currently building a bigger prototype which is expected to produce a COP of 5 to 6. Problems with electrode life seems to have been overcome by FutureOn, since this system has surviced 8 months of tests so far. They have worked with both 'wet' and 'dry' plasmas.

Their main achievement in potentially commercial terms is the CPP, the Catalyzed Plasma Reactor (Gas loading & HV discharges) with current COP over 2,0 (with 10g active material). This is also being developed as a bigger prototype, at the final design stage. It is expected that final COP of the new prototype will be from from 10 up to to self sustaining ability.

Both systems use features like deuterated nano-metal fuel mixed with other materials. Duration of the active material? 10 months of tests so far.

Компания Biaco

Протокол испытания Водяного реактора

BIACO WATER CELL

This technology has a UK patent. GB2604853B. Biaco is headed up by Professor Andy Atkins. As the company has 'gone dark' there is little to show, but Andy did confirm in a call they have a steady COP of 5+ and commercial prospects. Not LENR he said, but 'burning gas underwater'. Which gave me a really good laugh. Their explanation is the XSH comes from ortho/para flip photons;

Time	kW-e Input	kW-th Output	Water Rate g/s	CoP (kW-th/kW-e)
Mins 0-10	7kW	49.6kW	15.5g/s	7.2x
Mins 10-20	8kW	56.0kW	14.8g/s	7.1x
Mins 20-30	8kW	50.5kW	13.3g/s	6.8x
Mins 30-40	8kW	50.5kW	13.4g/s	7.0x
Mins 40-50	8kW	50.4kW	13.3g/s	7.1x
Mins 50-60	8kW	50.2kW	13.3g/s	6.9x
Mins 50-60	8kW	49.8kW	13.4g/s	7.0x
Mins 50-60	8kW	50.1kW	13.4g/s	7.2x
Overall Average	**8kW**	**50.9kW**	**13.7g/s**	**7.0x**
Maximum	16kW	80kW	**15.8g/s**	**13.0x**
	Percentage of time CoP > 5			*77%*

HYLENR
Индия

HYLENR – A NEW KID ON THE BLOCK

Based at the Centre for Energy Research (CER) affiliated with Bangalore University HYLENR's LENR work began in 2015.
The team at has performed hundreds of experiments with various active materials like Nickel, Palladium, Lithium Aluminium Hydride, Lithium, Hydrogen, Deuterium and the development of instrumentation and data acquisition to capture the phenomena.
The system shown on the left is -as the small-print shows – a design concept – but they are taking orders. One to watch or talk to- they are here with us.

METATRON N.R.G. Ltd. (Israel)

Metatron N.R.G have not published much information, but they also appear to be operating a 'plasma in heavy water' system operating at up to 20kV within an external magnetic field. They say the system creates plasmoids which catalyse fusion via the quantum mechanical effect known as tunnelling.

While micro-plasmoids—self-confined plasma bodies have been known to exist for almost a century, Metatron N.R.G.'s achievement lies in generating stable plasmoids. They state that this will enable the development of small fusion reactors, comparable in size to a desktop computer.

After three years of research and development they claim to have achieved ongoing fusion events in their lab, establishing the proof of concept for this novel approach. They say 'current efforts focus on enhancing what we have already achieved to establish a fully functioning nuclear fusion reactor capable of directly generating electric power.'

Their work is supported by an Israeli patent application 63/176/172

Научно-Технологический Центр BG
Италия

Kilometro Rosso is already one of the most important science parks in Italy and has been accredited by CENSIS (in its 2009 report) as one of the ten most significant initiatives for innovation in Italy. It has also been chosen as the seat of many important events and research, as well as a place for the production of advanced technology solutions and service initiatives. It currently employs more than 1,500 people.

The prospects for the future are even more promising: when the park is completed, it will provide work for at least 3,000 scientists and highly qualified staff and will be home to some 80 companies, research centres and laboratories.

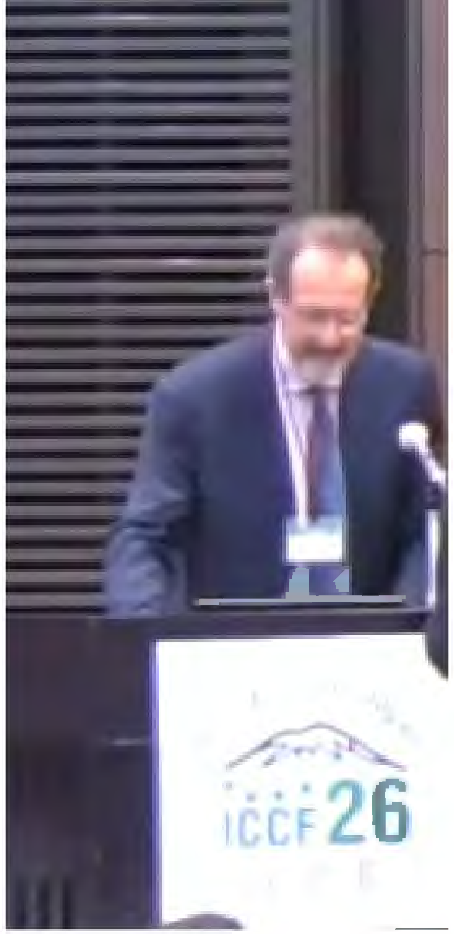
Conclusions

As we have seen, there is a resurgence of interest in commercialising various types of plasma-based LENR technologies. How many - if any -of these make it into Walmart is for the market to decide, but it clearly demonstrates that given a good idea and the right story there is finding available, both public and private. And funders love the word plasma, while many don't know what it is, they all know it's the fourth state of money.

THANKS FOR WATCHING.

PLEASE CONSIDER JOINING ISCMNS.org.
WE ARE STRONGER TOGETHER

1:03:54



Взгляд со стороны Администрации ЕС

EUROPEAN POLITICAL ENVIRONMENT

- The Ukrainian war is shifting resources in general and also in research

- Right leaning parties seem to push for a return to fossil and fission energy and away from renewables alternative energies.

- More and more stress has been put on close to market R&D, and mostly in "traditional" sectors.

- All this is hardly favorable to breakthrough research like LEAP.

Важнейшие опубликованные работы по LENR

In the meantime…

Nature published two papers on cavitation results…

Not without a fight, at least for the first paper

Yet this seems very important to me

scientific reports

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nature › scientific reports › articles › article

Article | Open access | Published: 02 January 2024

Water can trigger nuclear reaction to produce energy and isotope gases

Bin-Juine Huang, Yu-Hsiang Pan, Po-Hsien Wu, Jong-Fu Yeh, Ming-Li Tso, Ying-Hung Liu, Litu Wu, Ching-Kang Huang, I-Fee Chen, Che-Hao Lin, T. R. Tseng, Fang-Wei Kang, Tan-Feng Tsai, Kuan-Che Lan, Yi-Tung Chen, Mou-Yung Liao, Li Xu, Sih-Li Chen & Robert William Greenyer

Scientific Reports **14**, Article number: 214 (2024) | Cite this article

8 months and counting…

05 January 2024 Editor's Note: Readers are alerted that the conclusions presented in this article are subject to criticisms that are being considered by the Editors. A further editorial response will

...he meantime…

...e published two papers on
...tion results…

scientific reports

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scientific reports

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nature › scientific reports › articles › article

Article | Open access | Published: 21 May 2024

Observation of neutron emission during acoustic cavitation of deuterated titanium powder

Max Fomitchev-Zamilov

Scientific Reports 14, Article number: 11517 (2024) | Cite this article

An Author Correction to this article was published on 19 July 2024

...nergy

...in this article
...response will

In the meantime…

In May 2024 kilometrorosso, ownedby the Bombassei family (Brembo founder) publicly announced funding LENR

https://www.prometheusreactor.com/

Our goal is to create energy that has zero emissions, from a reaction using water and electricity.

The Prometheus Reactor stems from the Low Energy Nuclear Reaction (LENR) field of research and from the decades of experience in the field by its scientists.

In the meantime… particles models

In 2023 and 2024 two papers from Vassallo from the CleanHME project propose alternative models of electron and proton that can explain some anomalous phenomena including LEAP and charge clusters (Prins, Irrgang etc)

Journal of Physics: Conference Series

PAPER • OPEN ACCESS

The Proton and Occam's Razor

Giorgio Vassallo[1] and Andras Kovacs[2]

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Journal of Physics: Conference Series, Volume 2482, The 13th Biennial Conference on Classic
Relativistic Dynamics of Particles and Fields (IARD 2022), 05/06/2022 - 09/06/2022 Prague, C

Citation Giorgio Vassallo and Andras Kovacs 2023 *J. Phys.: Conf. Ser.* **2482** 012020

DOI 10.1088/1742-6596/2482/1/012020

In the meantime…

In April 2024 Vassallo published an interesting application of their electron model to Metal-hydrogen LEAP, filling in some gaps of the WL model by providing a justification for how collective effects could transfer energy **preferentially** to few electrons.

Charge Clusters, Low Energy Nuclear Reactions and Electron Structure

April 2024

DOI:10.13140/RG.2.2.16518.38725/4

Authors:

Giorgio Vassallo
University of Palermo

In the meantime…

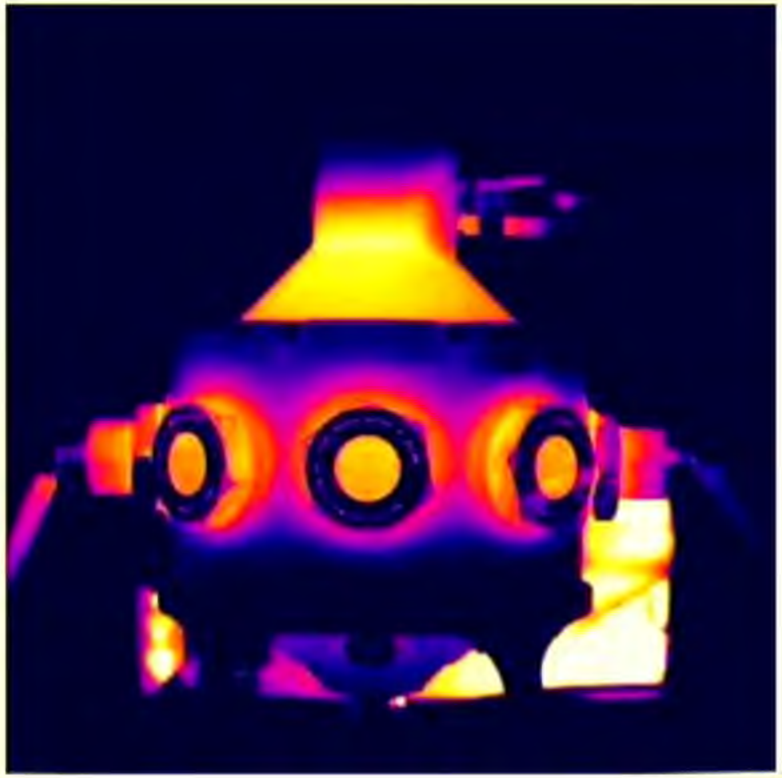
- A year later they just completed an independent validation of their scaled-up plasma-in-liquid technology by a leading research service company, confirming the usual effects:

  - excess heat
  - elemental metamorphosis

But also

  - excess hydrogen production with no corresponding oxygen
  - exploitable mechanical effects

- Working with a multidimensional matrix approach and a very hard nosed Industrial attitude



In the meantime… cavitation

In early July 2024 I witnessed the first run of a new cavitation reactor designed by the group of Dr Bassani based on earlier Cardone cavitation experiments

A few days ago I learned of the premature death of Walter Sala, the developer of the Piezoceramic exciter at the heart of these machines

RIP

In the meantime…

- The analysis of the ashes, performed with multiple techniques, show a huge number of metamorphoses
- Some have very high concentrations (tens of thousands ppm) other are present in gradually lower OOM, suggesting primary and secondary reactions are taking place
- Some show significant variations of the isotopic abundances, a smoking gun that cannot be ignored

Table 1. Reaction products of the DST-reactions in mercury ordered by atomic number Z. The elemental concentrations in column 4 is related to the analysed sample, not the whole mole of mercury. In bracket, isotope position by natural abundance on the Earth: 1st, 2nd, 3rd, … isotope; mono represents naturally monoisotopic element on the Earth.

Z	Element/isotope in [16,17]	Other detected element/isotope	Elemental concentration	Detecting techniques
3	^{7}Li (1st)		0.40 ± 0.05 ppb	ICP-OES ICP-MS
4		^{9}Be (mono)	0.004 ± 0.001 ppb	ICP-MS
22	^{47}Ti (3rd)		7800 ± 800 ppm	ICP-OES ICP-MS ESEM
23	^{51}V (1st)		0.10 ± 0.03 ppb	ICP-MS INAA
27	^{59}Co (mono)		34 ± 2 ppm	ICP-OES, INAA XRF
28	^{58}Ni (1st)		186 ± 20 ppm	ICP-OES INAA XRF ICP-MS
31	^{69}Ga (1st) ^{71}Ga (2nd)		84 ± 10 ppm	ICP-MS XRF INAA
32		Ge	2780 ± 300 ppm	XRF
34	^{78}Se (2nd) ^{82}Se (4th)		240 ± 25 ppm	ICP-MS XRF
35	^{79}Br (1st)		77 000 ± 5000 ppm	ESEM INAA XRF
37		Rb	335 ± 35 ppm	XRF
39		^{89}Y (mono)	56 ± 8 ppm	ICP-MS INAA
42		^{95}Mo (3rd) ^{98}Mo (1st)	1113 ± 3 ppm	ICP-MS INAA
48		^{111}Cd (3rd)	6 ± 2 ppm	ICP-MS XRF
49		^{113}In (2nd)	10820 ± 120 ppm	INAA
50	^{118}Sn (2nd) ^{124}Sn (6th)		6 ± 0.6 ppm	ICP-MS INAA XRF
51		^{121}Sb (1st) ^{123}Sb (2nd)	0.30 ± 0.13 ppm	ICP-MS INAA
58	^{138}Ce (3rd) ^{140}Ce (1st)		34.5 ± 4.0 ppm	INAA ICP-MS
63		^{151}Eu (2nd)	31 ± 7 ppb	INAA
64		^{152}Gd (7th) ^{158}Gd (1st)	417 ± 17 ppm	INAA
70		^{174}Yb (4th)	57 ± 24 ppm	INAA
71		^{176}Lu (2nd)	141 ± 37 ppm	INAA
72	^{177}Hf (3rd)		450 ± 50 ppm	INAA XRF
75		^{185}Re (3rd)	30 ± 3 ppm	INAA
78		^{190}Pt (6th) ^{195}Pt (1st)	1332 ± 9 ppm	INAA ICP-MS

1:20:08

Annals of Mathematics and Physics

!!!!!!

Research Article

Energy metrics and their Ricci flows

Sergio Benenti and Fabio Cardone

In the meantime… fundamental theory

- In February 2024 a paper from Cardone and Benenti unifies the 4 thresholds in their DST theory, showing a 6th power dependence of the energy around the unified threshold.
  - This could explain how small changes in the experiment can lead to failure
  - Unfortunately also Prof Benenti passed away, RIP

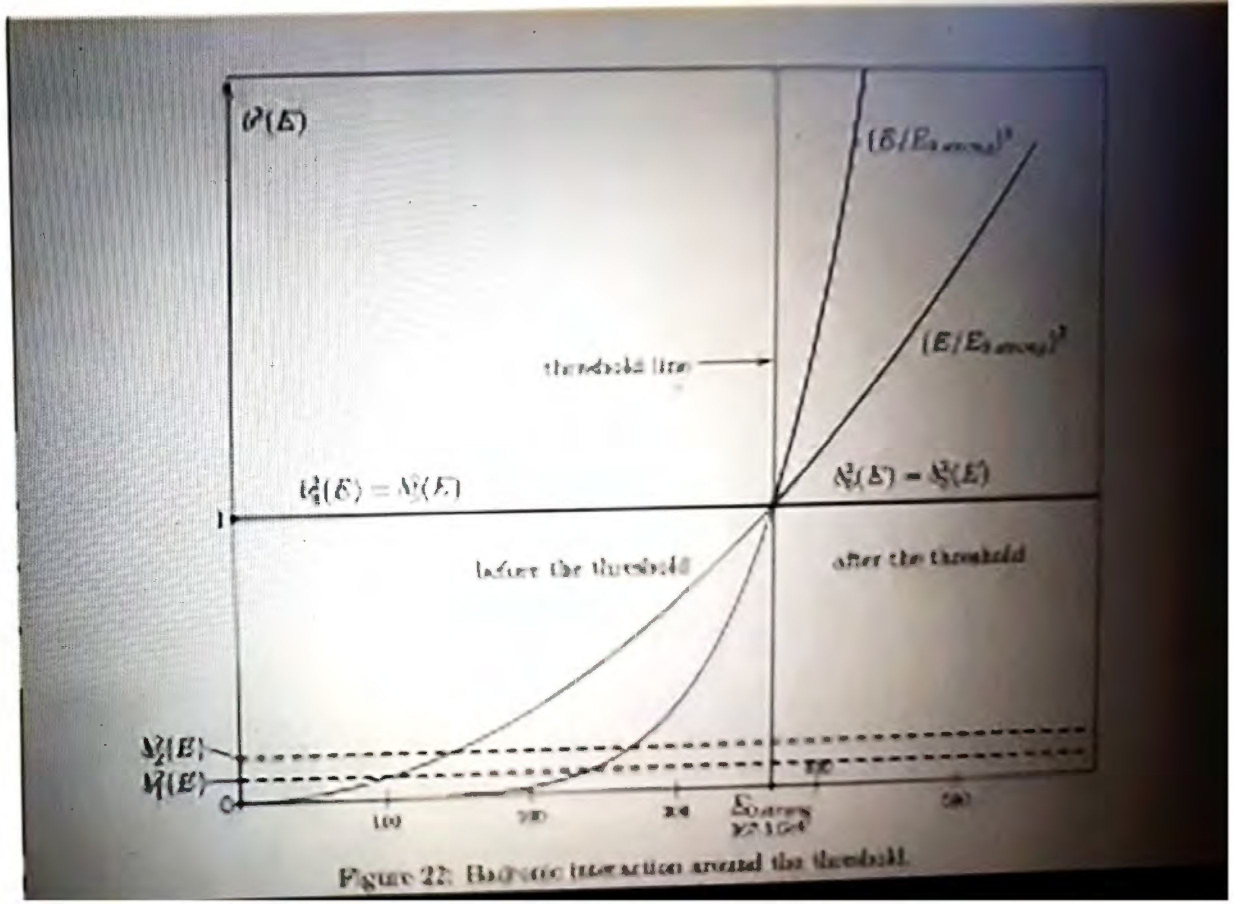


Figure 22: Hadronic interaction around the threshold

In the meantime… beyond energy

- Prof Carpinteri, working in CleanHME, reported neutron emissions from early stage fatigue testing, after explaining years ago earthquake neutron emissions
- A clear indication that working on LEAP can lead in many directions beyond energy

Politecnico di Torino

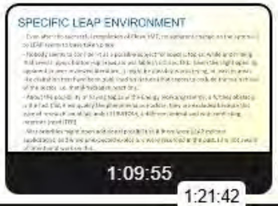
1859

CLEAN HME

“Clean Energy from Hydrogen-Metal Systems”

Report 2

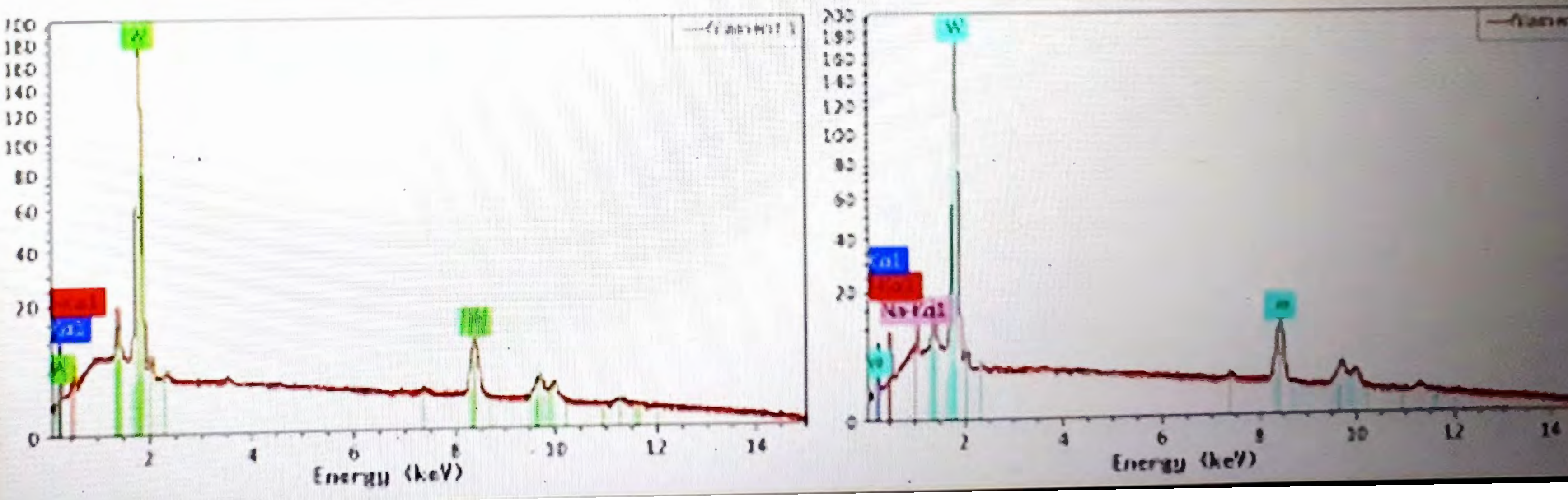
Neutron fracto-emissions for early-stage fatigue diagnosis



In the meantime… simple LEAP proof

Dr Kovacs, working in CleanHME, recently reproduced the 1921 Wendt—Irion experiment at lower voltage, achieving similar results (yellow 589.4 nm Na line)

This is in my view another smoking gun with which the scientific establishment should explain



In the meantime…

In April 2024 Vassallo published an interesting application of their electron model to Metal-hydrogen LEAP, filling in some gaps of the WL model by providing a justification for how collective effects could transfer energy **preferentially** to few electrons.

Charge Clusters, Low Energy Nuclear Reactions and Electron Structure

April 2024

DOI:10.13140/RG.2.2.16518.38725/4

Authors:

Giorgio Vassallo

In the meantime… tritium production

- Righes and Vassallo continued their cooperation on light water electrolysis producing tritium, a possible answer to Claessens

- Since the presentation at ICCF24 they report high reproducibility and production levels, with radiation 20 times higher than the background and heat-after-death effects

- CleanHME found a new low energy fusion channel

- Cooperation might be a win-win

How to go ahead (possibly fast)?

Выводы Доклада

- ARPAe colleagues are progressing, and they clearly hint at a follow up with big money in case of success (but what about the big beautiful bill?)
- Japanese colleagues show industrial approach
- We saw industry is getting interested also in Europe, public funding can help them if needed but LEAP still need to be first accepted by funders
- Public funding must help also basic research to improve understanding and theories, industry will not develop it but will surely benefit if successful
- In this case academia is in control of basic research so we need a breakthrough in acceptance
- More active engagement is needed, experimental results are the key
- Timing of all this has been slow up to now, which also means experts are getting old and not enough young scientists are picking up the torch
- **We need highly funded, focussed LEAP initiatives if we want a real impact on climate and more!**

Current Status of Research and Development of Condensed Matter Nuclear Science in Japan

Yasuhiro Iwamura

School of Science, Graduate School of Nanobioscience,
Department of Materials System Science,
Yokohama City University, Yokohama, 236-0027, Japan

The 26th International Conference on Condensed Matter Nuclear Science : ICCF26, May 26-30, 2025, Aiina, Morioka, Japan

ICCF26

Contents

Pause

1:27:44

1.1 Electrolysis experiments in Japan in the early days

Various types of experiments had been conducted since just after the F&P announcements.

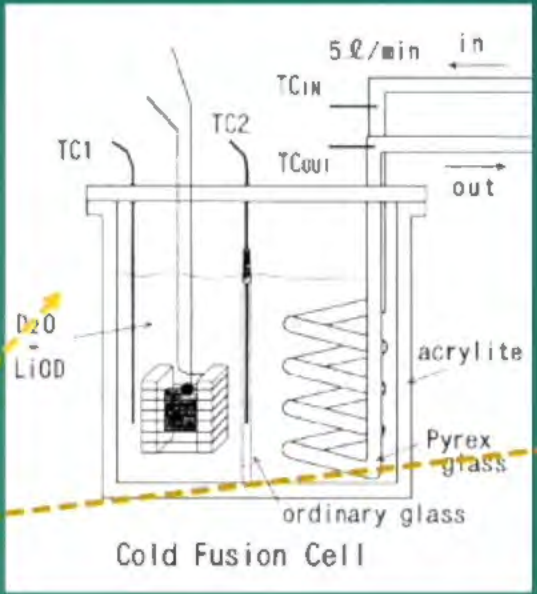
D_2O electrolysis : D-Pd system

F&P type

Excess heat, Neutron emission, Transmutation

Takahashi et al., Proc. of ICCF3 (1992).

T. Mizuno, T. Ohmori and M. Enyo,. J. New Energy, 1(2): 37 (1996).



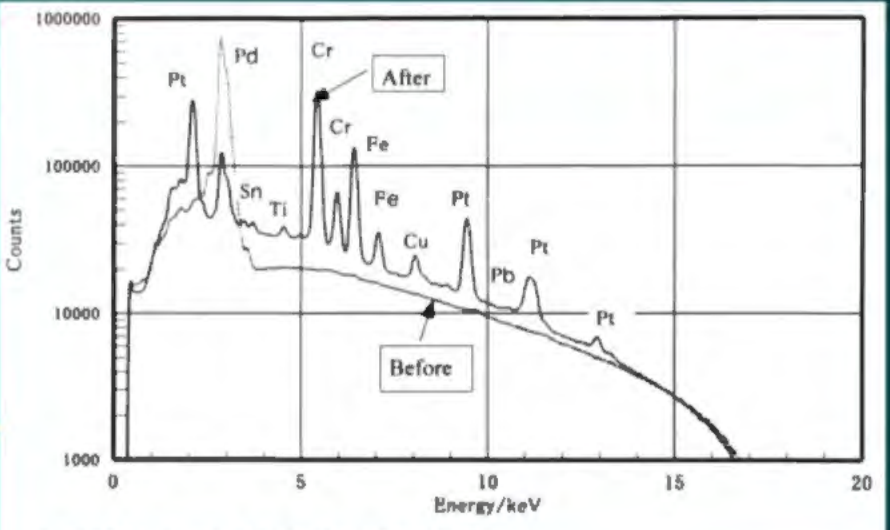


Fig. 1. EDX spectra from the Pd rod before and after the electrolysis.

H_2O electrolysis : H-Ni, Au system

Excess heat, Transmutation

T. Ohmori and M. Enyo, Proc. of ICCF3(1992)

R. Notoya et al., Fusion Technology., 24: 202-204(1993)

T. Ohmori, M. Enyo, T. Mizuno et.al, Fusion Technology, 33:3, 367-382 (1998)

TABLE II

Isotopic Contents of Fe Produced in Various Electrolysis Systems

Sample	Total Ion Intensity (count)	Isotopic Content (%)		
		^{54}Fe	^{56}Fe	^{57}Fe
1	17 205	3.2	74.7	22.0
2	619 950	5.6	84.7	9.6
3	192 134	3.7	67.4	28.9
4	1 254 164	7.0	67.6	25.3
5	141 211	6.6	84.1	9.2

1.2 NHE (New Hydrogen Energy) Project

Period: 1993-1998 (~ 3B Yen; ~ 25M Dollar: \120/$)

Conducted by NEDO (New Energy and Industrial Technology Development Organization) under MITI (Ministry of International Trade and Industry: METI at present)

NHE Demonstration Team

Experiments performed at IMRA Japan (Toyota Gr) with seconded staff from Hitachi, Toshiba, Mitsubishi Heavy Industries, Aisin Seiki, etc.

Fundamental Research Team

1. Excess Heat: Ota (Yokohama National U)
2. Correlation: Takahashi (Osaka Univ.)
3. Nuclear Physics: Kasagi (Tohoku U)
4. Material: Sakamoto (Nagasaki U)

Важный вывод!!!!!

The final report was that NO excess heat phenomenon was observed.

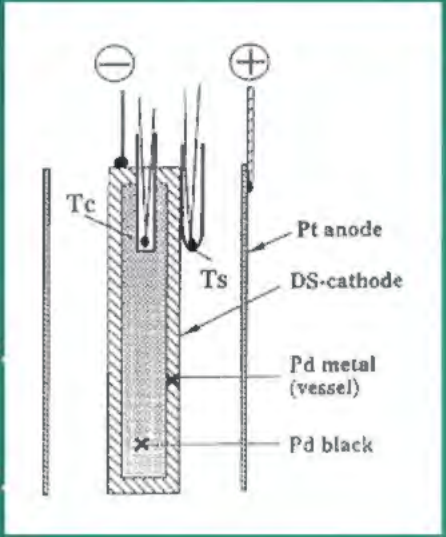
1:31:07

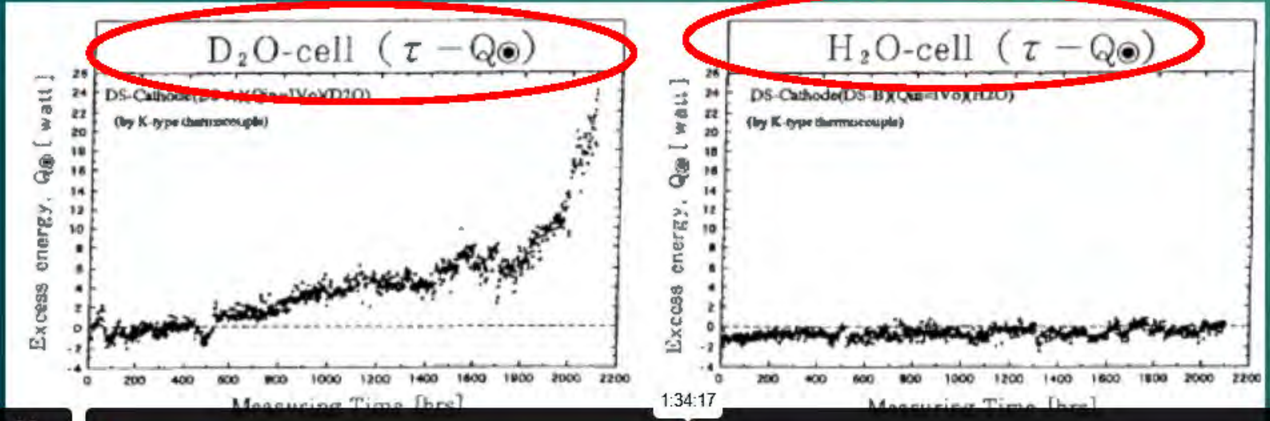
1.3 Hybrid experiments of electrolysis and gas loading

Double structure cathode (Sub-nano Pd particles)

Excess heat, He production

Arata and Zhang, Proc. of ICCF5 (1994).
*Arata and Zhang, Jpn. J. Appl. Phys. **37** (1998)1274.*
*Arata and Zhang, Jpn. J. Appl. Phys. **38** (1999) 774.*

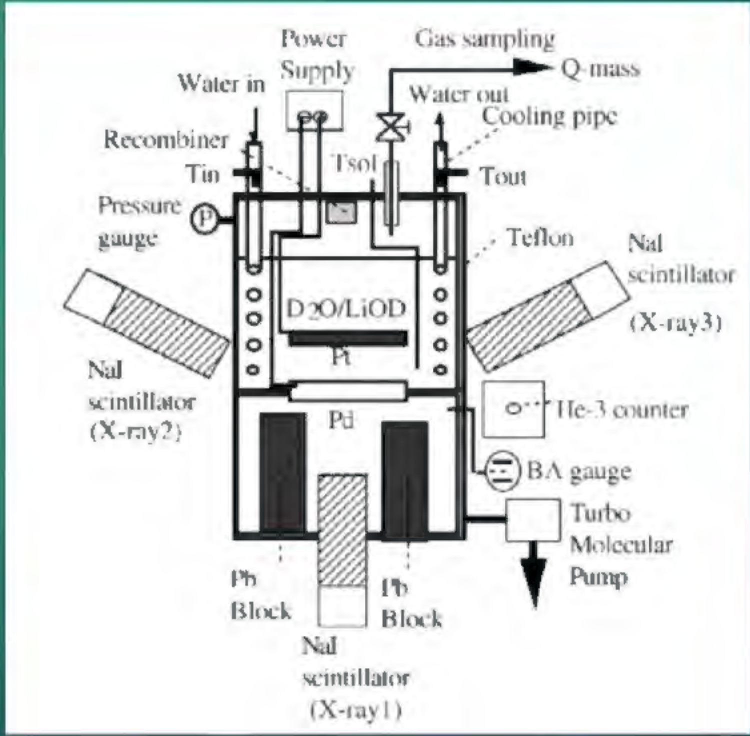


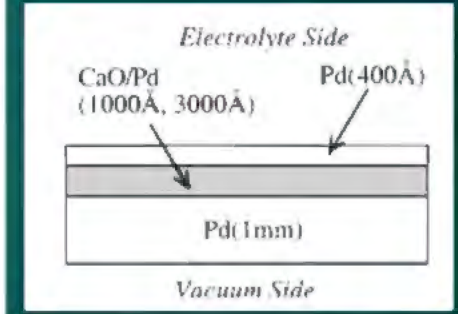


Multi Layer cathode

Excess Heat, Transmutation products

Iwamura et al., Proc. of ICCF6 (1996).
Iwamura et al., Fusion Technology, 33 (1998) 476.





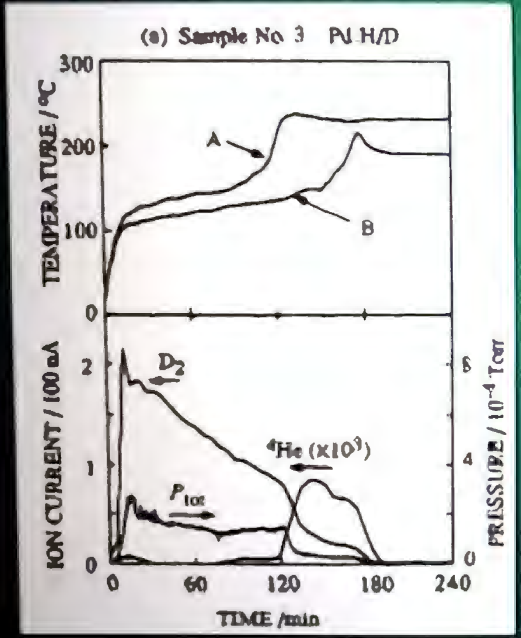
1.4 Gas Loading Experiments(1)

Gas loading type experiments have been popular in Japan.

Deuterium gas loading/unloading

Excess heat, He production

E. Yamaguchi, Proc. of ICCF3 (1993).

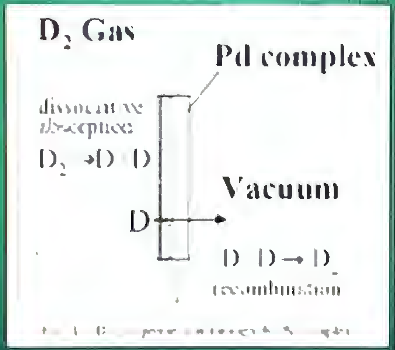


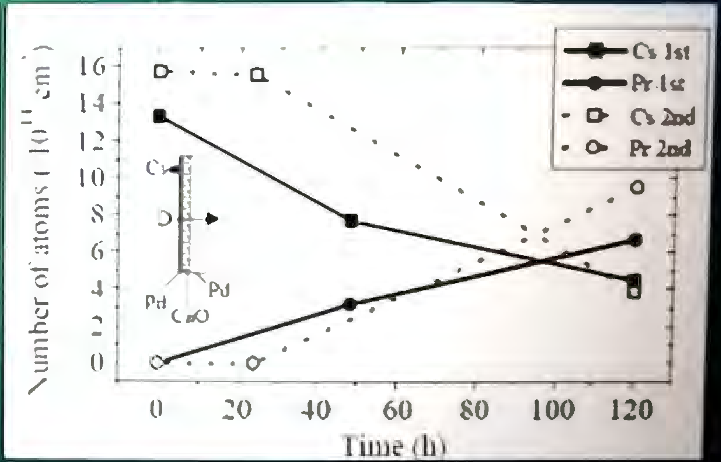
D permeation with multi layered metal complex

Transmutation products (Cs -> Pr)

Y. Iwamura et al. Jpn. J. App. Phys., 41 (2002) 4642.

Y. Iwamura et al., Current Science, 108 (2015) 628.





1.4 Gas Loading Experiments(2)

Gas loading type experiments have been popular in Japan.

D/H absorption/desorption with nano-sized metal composite particles

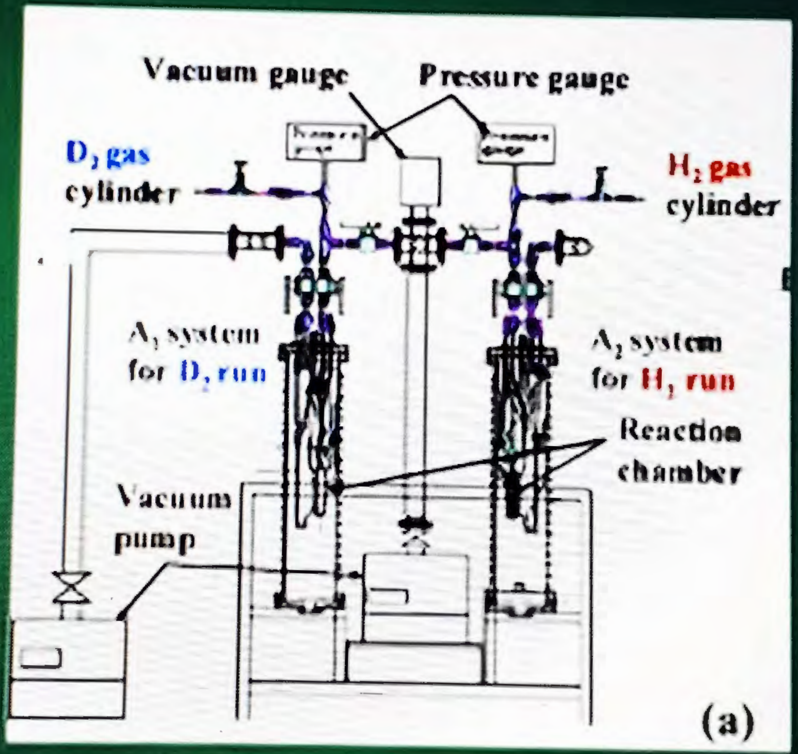
Excess heat

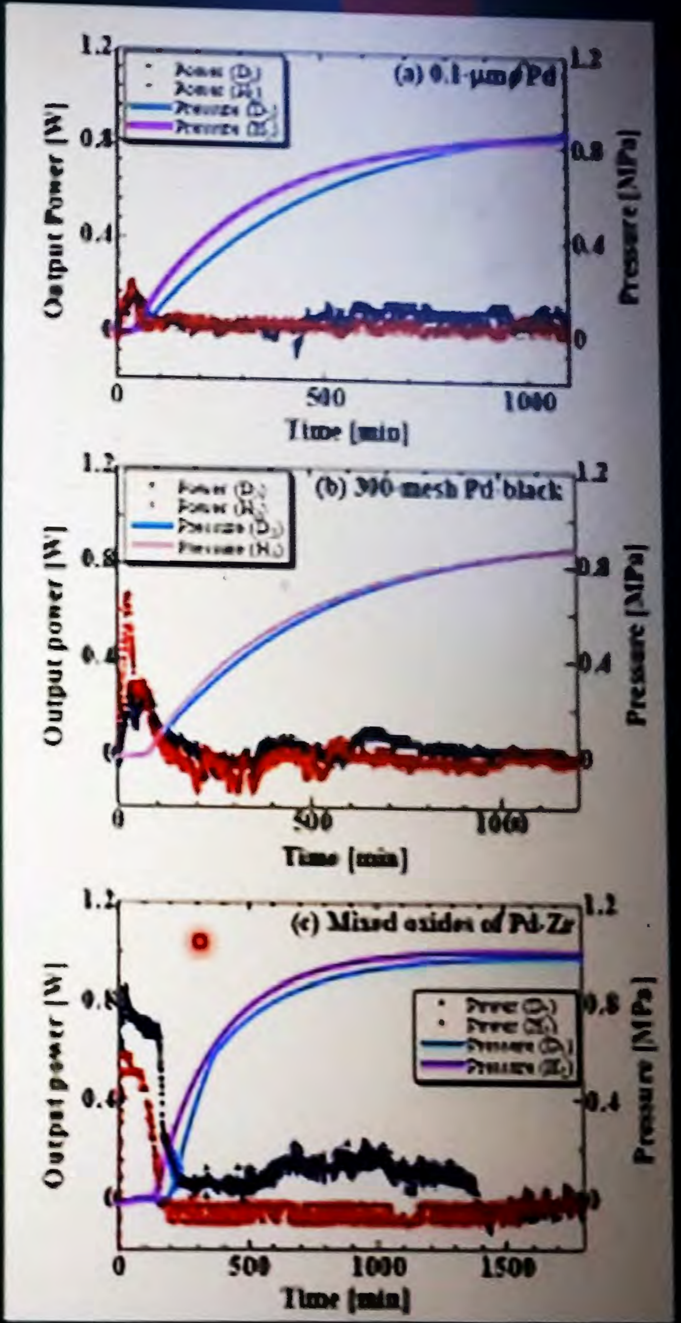
Kitamura & Takahashi et al., Physics Letters A 373 (2009) 3109.

D/H absorption/desorption with multi layered metals complex.

Transmutation and Excess heat

Narita et al., J. Condensed Matter Nucl. Sci. 11(2013).



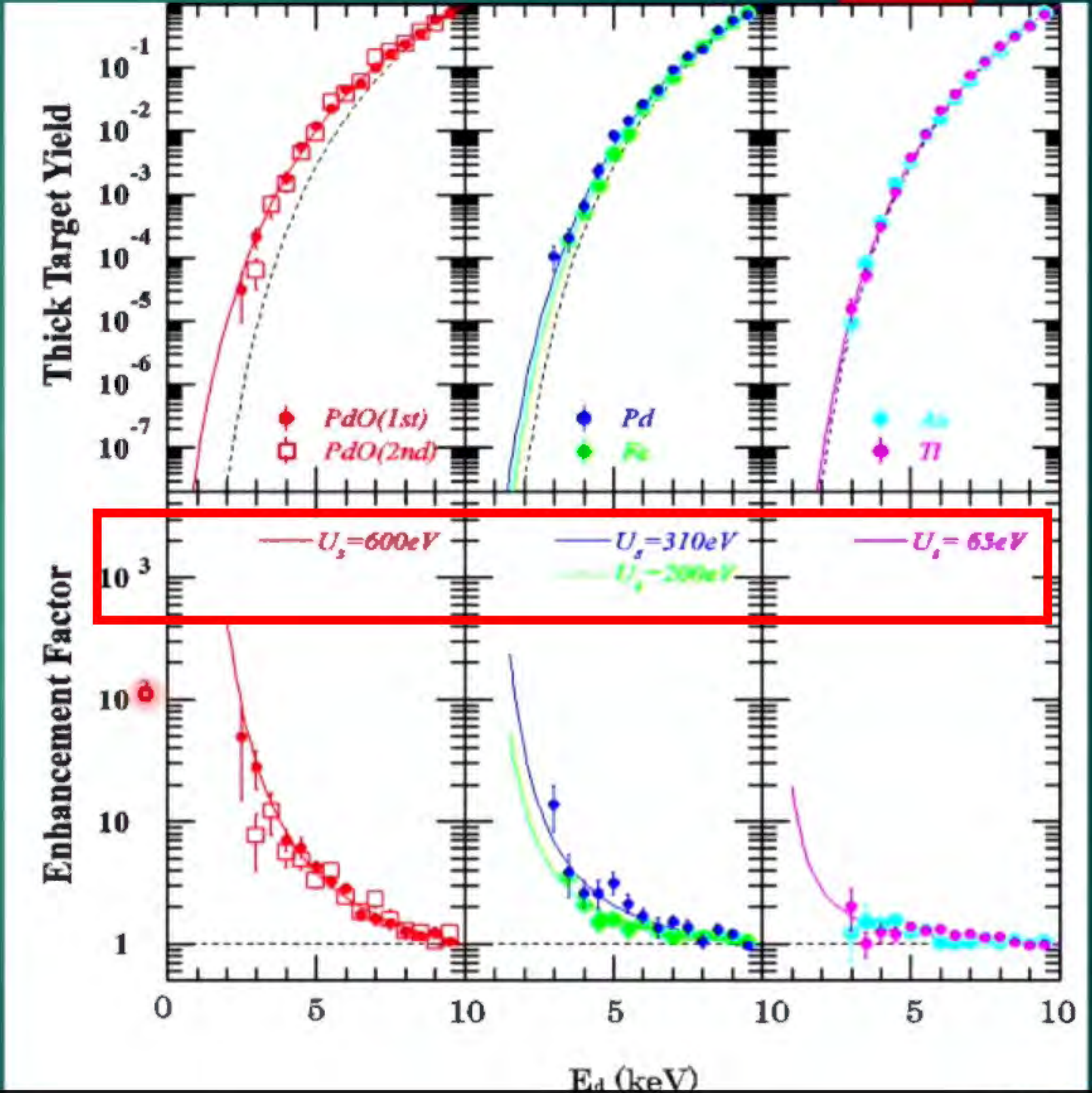


1.5 Beam Experiments

Low Energy Deuteron (keV) Bombardment on Pd, Ti, etc.

Anomalously Large Enhancement of DD Fusion rate at Low Energy

Yuki et al., JETP Lett. 68 (1998) 823
Kasagi et al., J. Phys. Soc. Jpn. 71(2002) 2881
A. Kitamura et al., Proc. of ICCF10 (2003)



1.6 Japan CF-Research Society (1999-)

JCF
Japan CF-research Society

Funded in 1999
President: Shinya Narita (Iwate University)
Member: ~70, currently
Objectives :
Contribute to science and technology development by studying CF phenomena, exchange information between JCF members and organize meeting for CF-research.
Annual meetings :
–The meeting has been held 24 times so far. (JCF1-JCF24)
–The proceedings have been published for all meetings.
http://www.jcfrs.org/proc_jcf.html

Partnership with ISCMNS

2.1 NEDO Project 2015.10~2017.10

Budget: 0.12 Billion Yen (0.89 Million Euro: \135/Euro)

Organizations: Technova, Nissan, Kyushu Univ, Kobe Univ, Nagoya Univ, Tohoku Univ

Outlines:

1. Nanoparticles consisting of Pd, Ni, Cu, and ZrO_2 absorbed by H_2 or D_2 gas were heated up to about 300℃ and observed anomalous heat generation that cannot be explained by known chemical reactions.
2. The same sample was divided between Kobe and Tohoku Universities, and the same level of excess heat was observed when the same experiment was conducted.
   ⇒ Reproducibility was confirmed.

TOHOKU

Technova Inc.

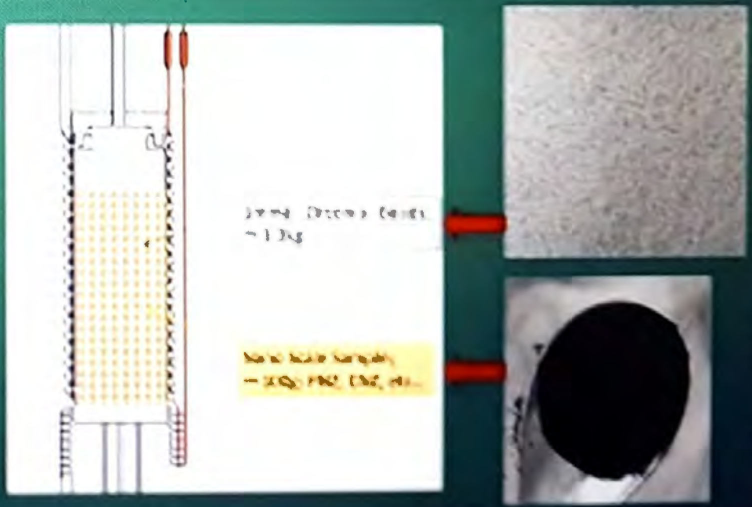
神戸大学

名古屋大学

NAGOYA UNIVERSITY

NISSAN

九州大学



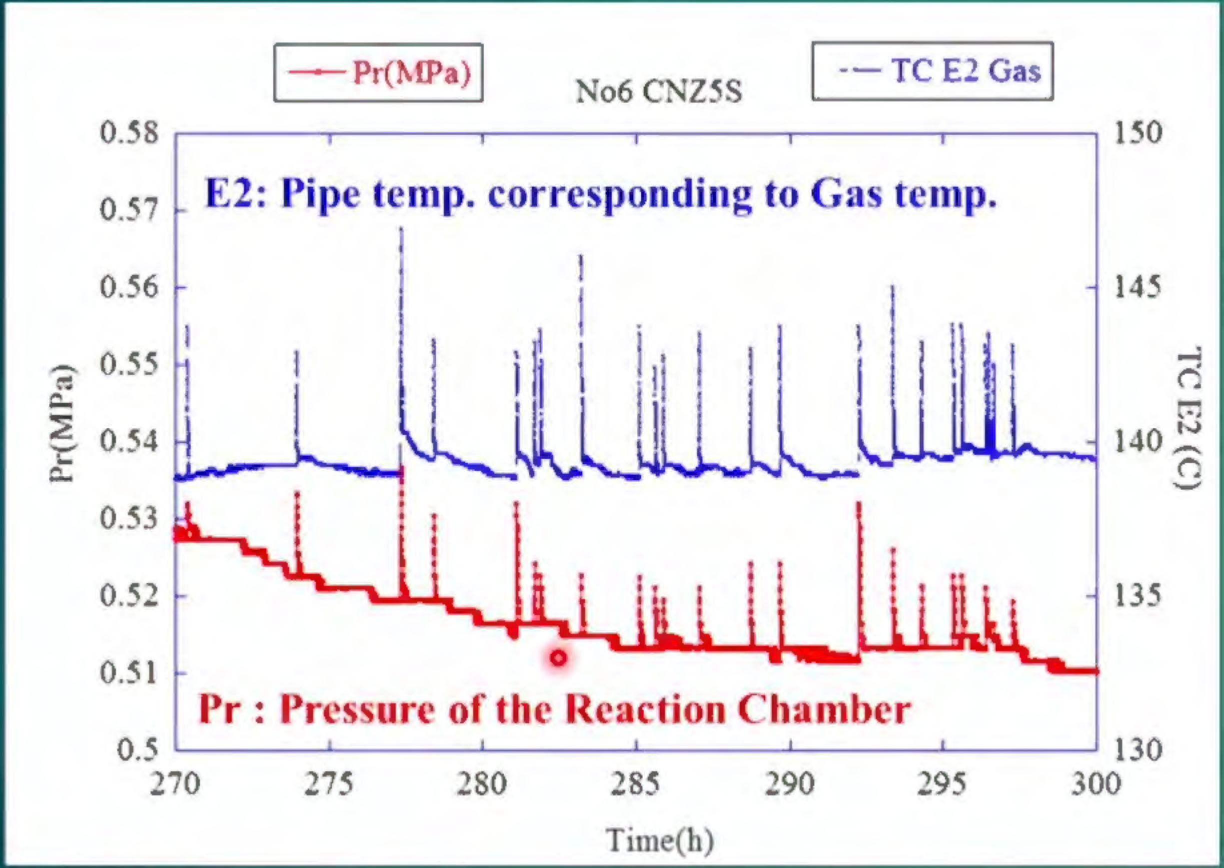
1mmϕ beads

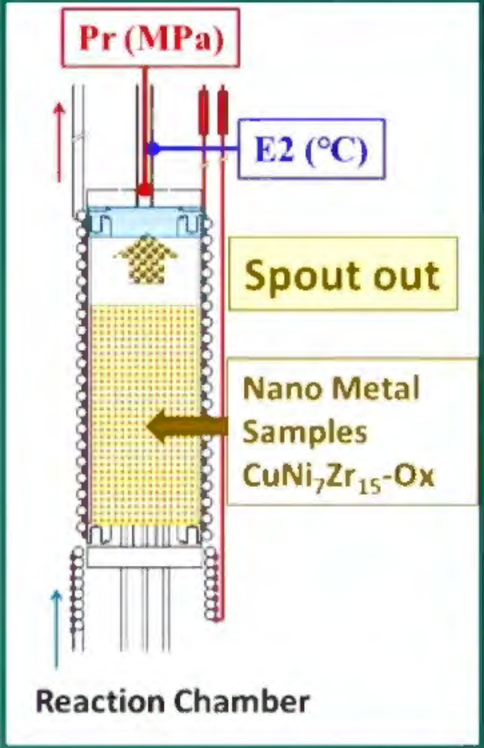
~1300 g

CNZ6s sample

~100 g

2.1 NEDO Project Results : Heat burst





$CuNi_7Zr_{15}$-Ox particles adhered to the flange surface. They spouted out from nanometal samples to the surface of the flange.

Burst-like Coincident Increase events of Chamber Pressure(Pr) and Upper Side Temperature(E2)

1:42:26

2.1 NEDO Project Results : Anomalous heat

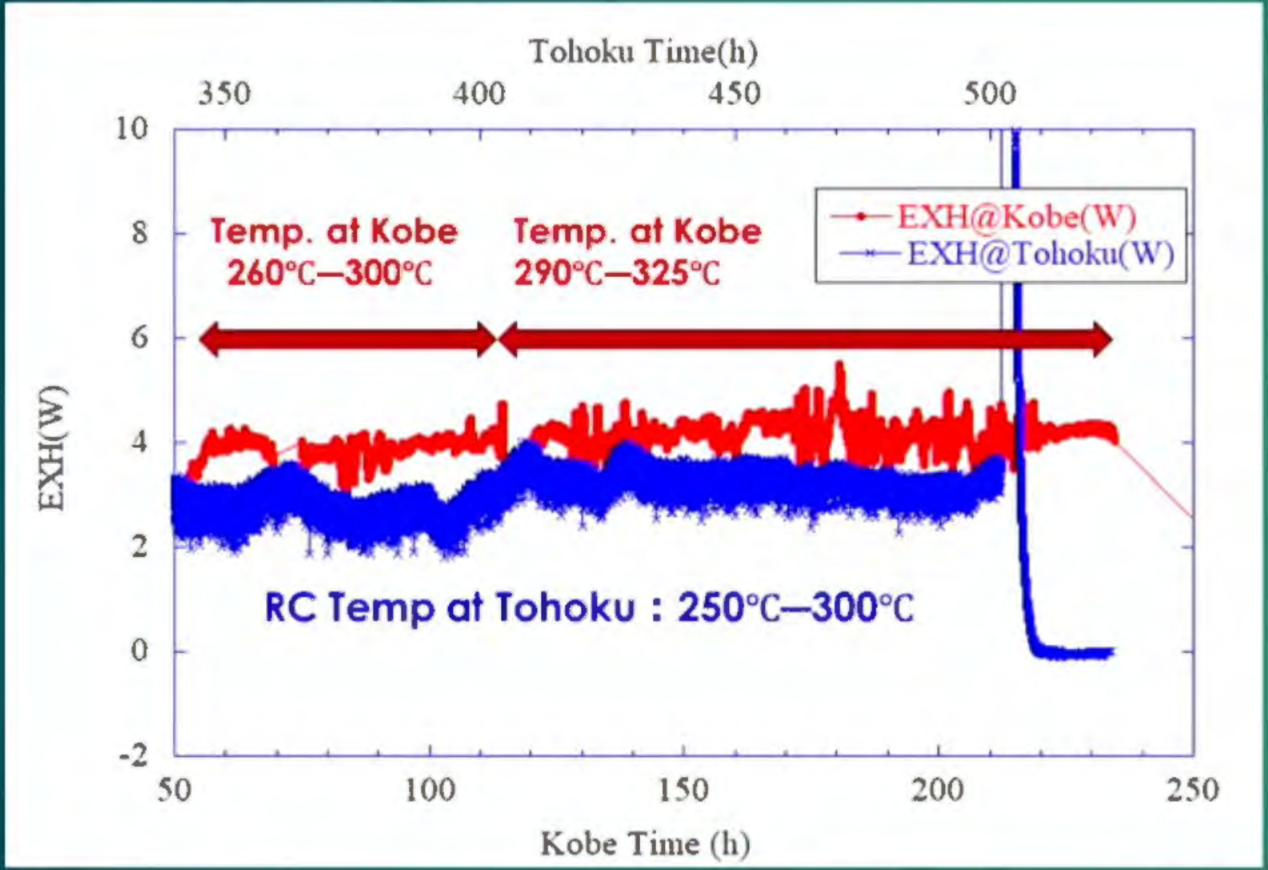
Table 1 – Summary of the results of collaborative experiments (yellow colored) and independently done experiments with PNZt [18], CNZt [18] and CNS2 [16,17]. "M (Ni or Pd) content" is the mass of the majority element, "Pd/Ni or Cu/Ni" is the atomic ratio, "H (D or H)" is the hydrogen isotope introduced into the RC, and "D(H)" means that D_2 gas was mainly used.

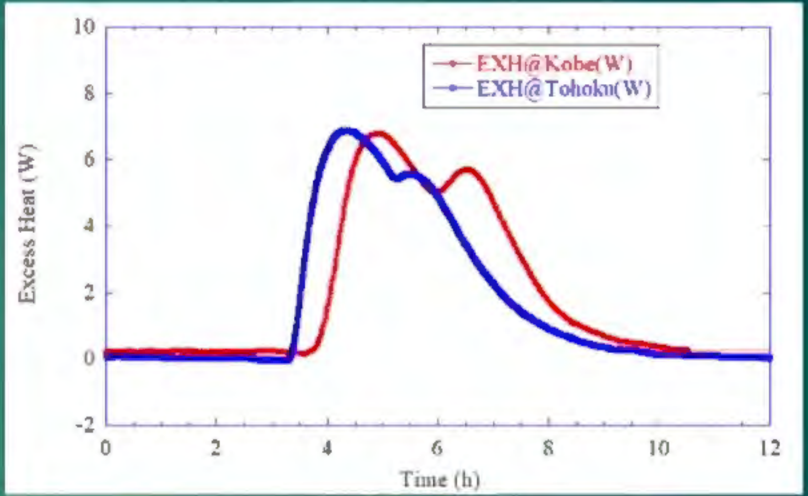
Sample ID	M (Ni or Pd) content	Pd/Ni or Cu/Ni	D or H	Room temp.						Elevated temp. (> 250°C)							
				L_M		$E_t = \int W_{a} dt$		η_{av}		L_M		W_{ex}		η_{av}		$E_{ex} = \int W_{a} dt / L_M$	
	(g)					(kJ/mol-M)		(eV/H)				(W)		(keV/H)		(MJ/mol-H)	
(collab)				#1	#2<	#1	#2<	#1	#2<	#1	#2<	#1	#2<	#1	#2<	#1	#2<
PNZt	6.4	1/7	D(H)	(1.1)	2.2	220	81	(2.1)	0.39	1.5	0.15	5.9	2.6	(0.29)	0.77	(7.8)	4.3
PNZ3	20.0	1/7	D(H)	3.4	1.6	200	62	0.61	0.43	2.8	1.1	8.0	10	6.5	16	3.7	5.7
PNZ3r	18.8	1/7	H	0.11	(5.3)	6.0	0	0.62	0	2.1	(7.4)	8.0	—	0.19	—	2.0	—
PNZ4	23.0	1/7	D	3.5	1.8	180	73	0.56	0.43	3.1	1.1	—	4.5	—	4.4	—	3.0
PNZ5	41.1	1/7	D	3.5	1.1	210	43	0.63	0.4	3.1	0.55	3.5	4.2	0.4	2.7	1.1	7.6
PNZ5r	40.7	1/7	D(H)	0.32	0.085	16	1.4	0.53	0.17	0.7	0.2	4.0	5.5	0.03	23	2.5	9.0
PNZ6	27.2	1/10	D(H)	3.5	1.2	190	48	0.58	0.41	2.8	0.62	24	17	0.35	16	14	44
PNZ6r	25.2	1/10	D	0.8	0.25	39	0.086	0.51	0.34	0.5	0.25	8	10	270	7.5	54	85
PNZ7k	20.8	1/7	D	3.4	1.3	190	49	0.56	0.38	2.6	0.7	4.2	3.1	2.6	1.4	2.5	3.4
CNZt	9.1	1/7	H(D)	0.19	0.19	6.7	3.7	0.37	0.2	1.7	0.2	4.0	2.2	1.7	0.83	11	150
CNZ5	22.0	1/7	H	0.2	—	9.8	—	0.50	—	1.9	—	8.0	—	2.8	—	2.6	—
CNS2	12.1	1/7	H	0.01	—	0	—	0	—	1.1	0.15	11	7.2	11	20	23	190
CNS3	11.4	1/10	H	0.03	0.02	1.5	1.5	0.57	0.65	0.8	0.16	2.4	4.4	1.4	4.7	6.0	90
PS3	17.3	∞	H(D)	2.1	1.3	130	25	0.60	0.20	0.9	0.7	—	< 1.7	0	0	0.0	0
PSf1	8.4	∞	D	2.6	1.6	130	29	0.51	0.19	1.6	0.7	< 1	< 2.2	0	0	0	0

(Excess Energy / absorbed D or H) is lager than known chemical reactions.

До 270 кЭв/Н…

2.1 NEDO Project Results: Reproducibility





	Kobe	Tohoku
Released Enthalpy (KJ/mol-D)	53.7	50.9
Released Enthalpy (eV/D)	0.56	0.53

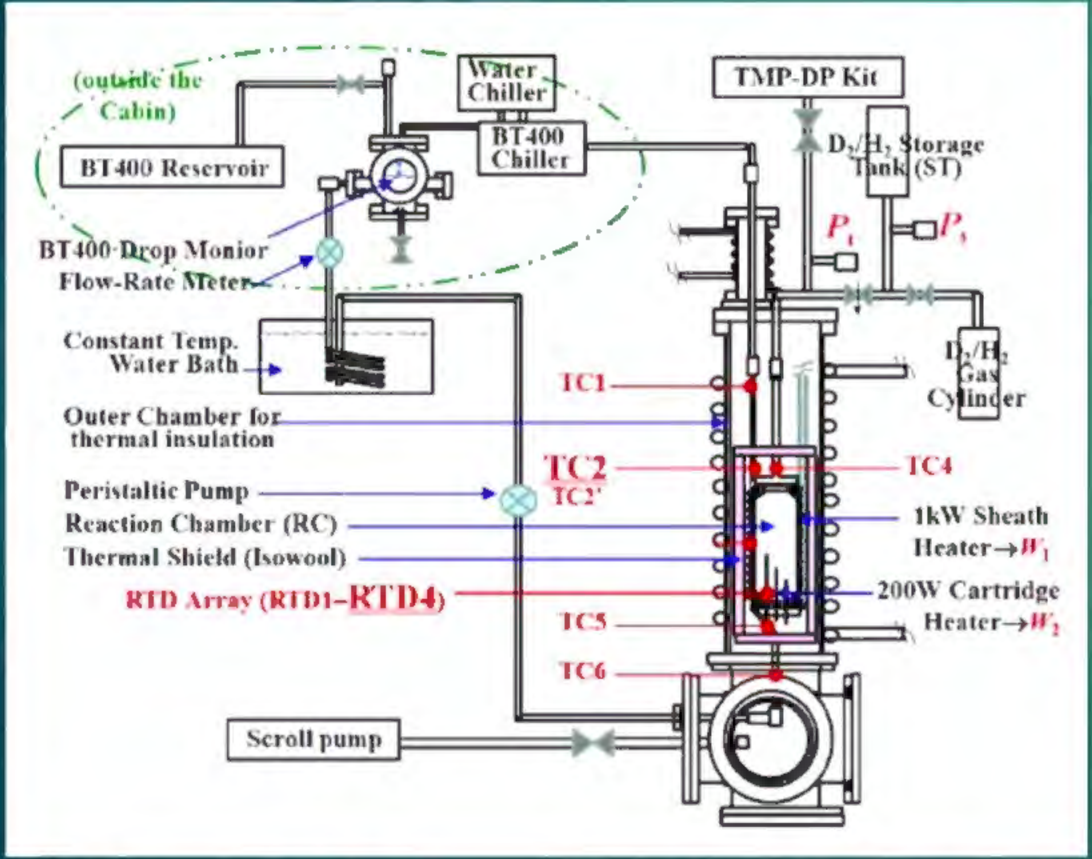
Same level excess powers were observed at Kobe and Tohoku universities.

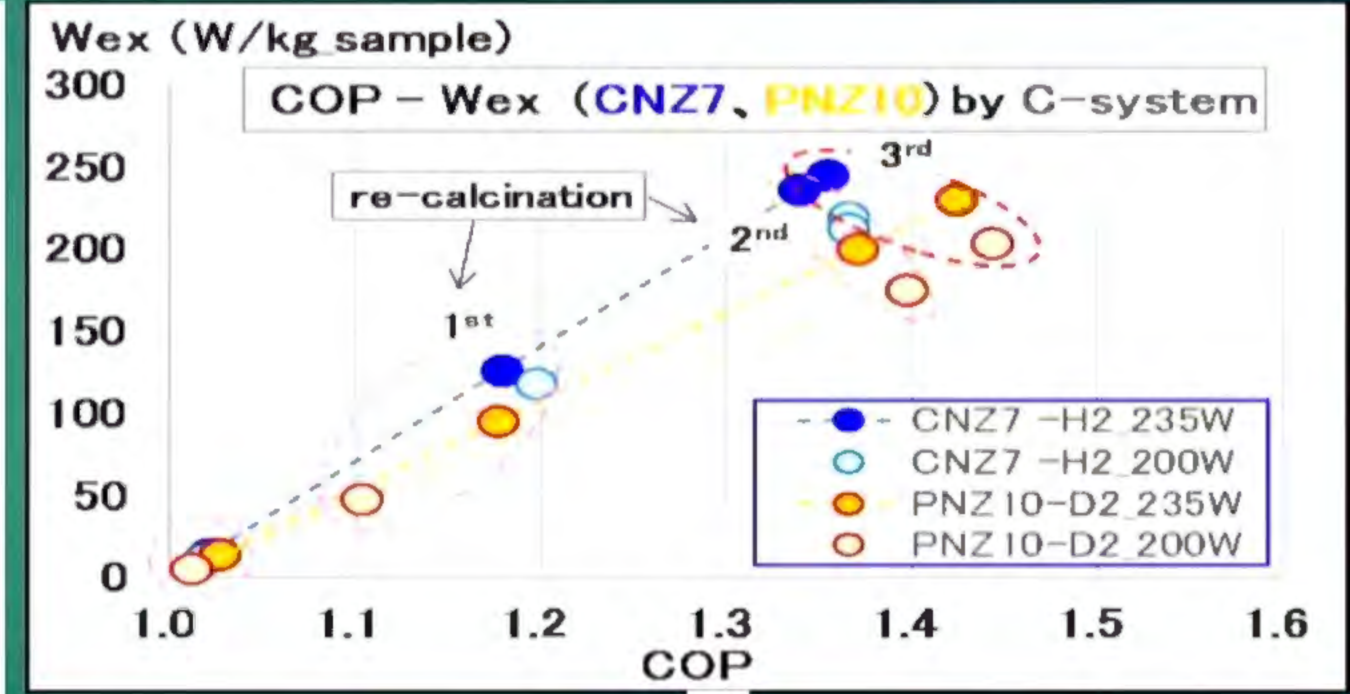
2.2 Current Research Participating Organizations (universities and companies) in Japan

Universities	*Companies*
Kyushu University	Nissan motor corporation
Kobe University	Toyota Central Research Lab.
Kyoto University	DENSO corporation
Waseda University	Mitsubishi Heavy Industries, ltd.
Tohoku University	Technova, Inc.
Iwate University	Clean Planet, Inc.
Yokohama City University	Z Mechanism technology Co.,Ltd.
Nihon University	New Hydrogen Fusion Energy, Inc.
Nagoya University	Hydrogen Engineering Application & Development Company
Tokyo University of Science	Cool Fusion, Co. Ltd.

2.3 Overview of university research: Kobe Univ(1).

Nanoparticles consisting of Pd, Ni, Cu, and ZrO_2 absorbed by H_2 or D_2 gas were heated up and observed anomalous heat generation





Technova Inc.

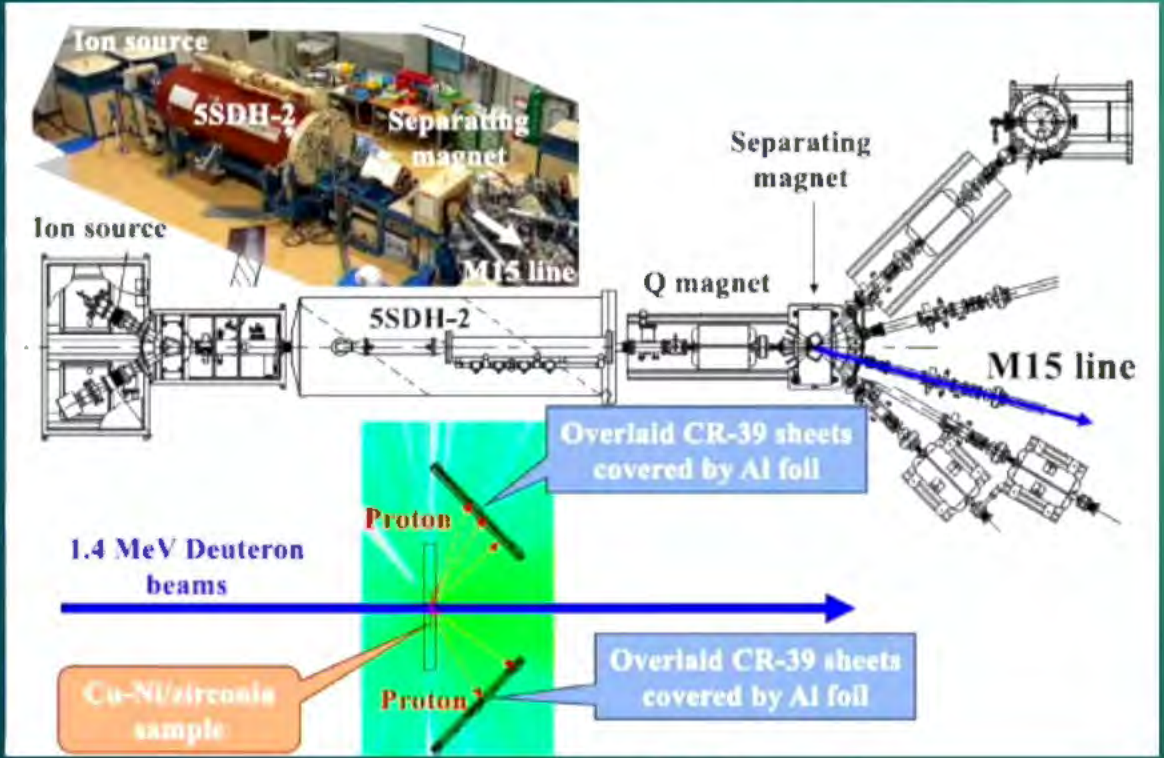
New Hydrogen Fusion Energy, Inc.

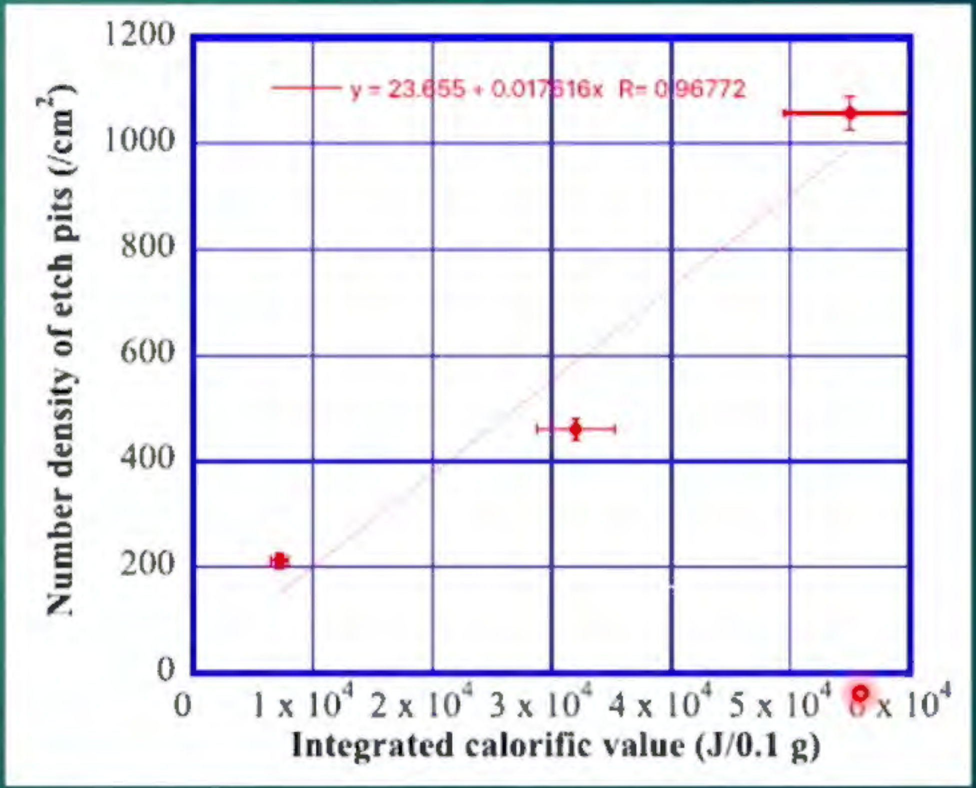
M. Hasegawa et al., *Proceedings of the 22nd Meeting of Japan CF*

2.3 Overview of university research: Kobe Univ(2).

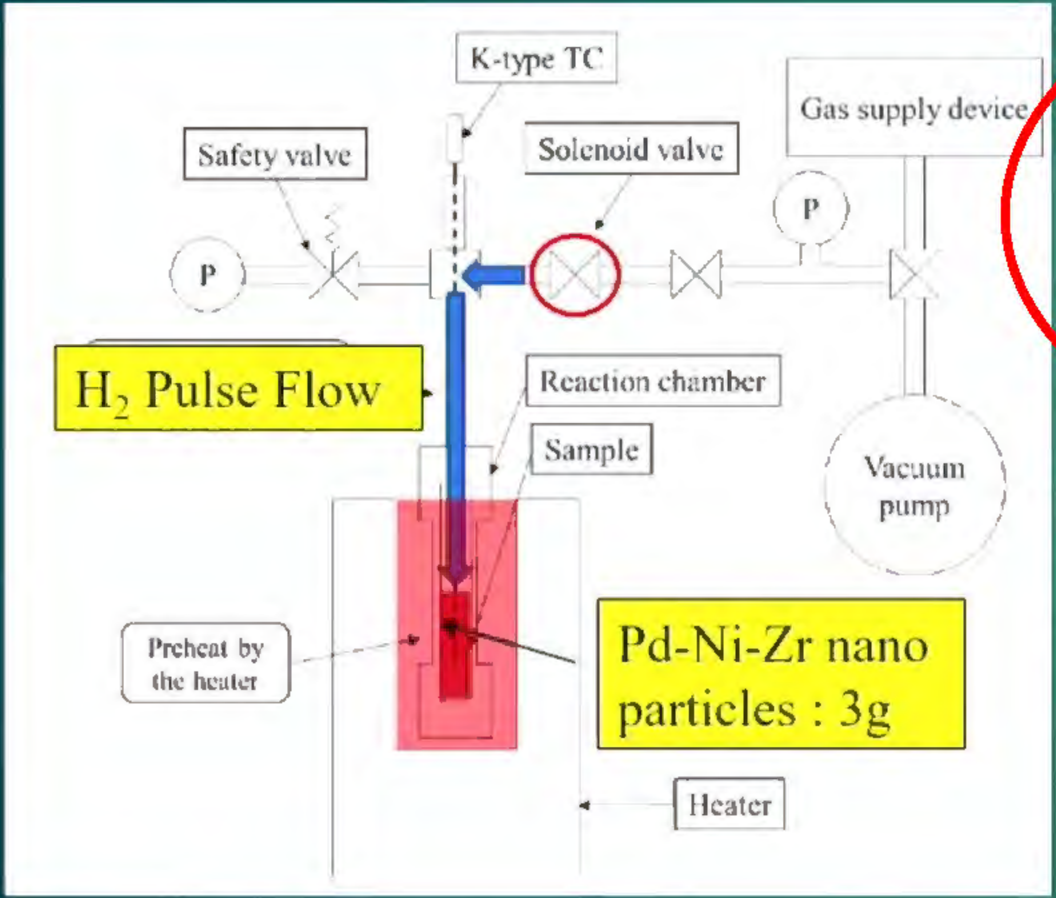
Helium-3 in nickel-based metal nano-composites doped with zirconia, which exhibited anomalous heat generation, was detected by NRA(Nuclear Reaction Analysis) and TDS(Thermal Desorption Spectrometry).

$$d + {}^{3}He \rightarrow {}^{4}He + p + 18.354\ MeV$$





2.3 Overview of university research: Waseda Univ.



Observation of anomalous heat generation by high-speed, high-pressure pulsed hydrogen gas impinging on a nanoparticle sample

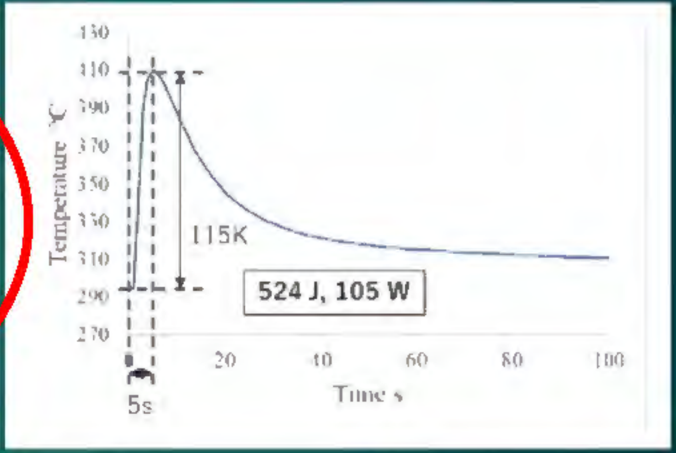


Table 3. Results of the experiments wit Without H_2

No.	Sample	Gas pressure	Initial temp.	Temp. rise	Heat generation	
1	Pd-Ni-Zr 3.0 g	0.12 MPa	95 °C	1.2 K	5.47 J	0.01 W
2	Pd-Ni-Zr 3.0 g	0.9 MPa	240 °C	12.4 K	56.5 J	0.72 W

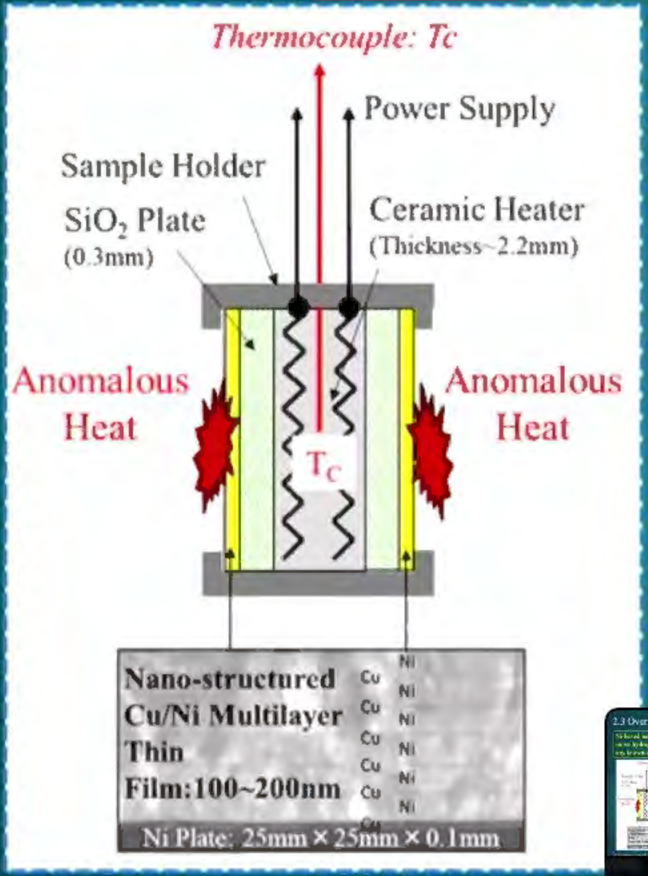
Table 4. Results of the experiments w With H2 pulsed flow

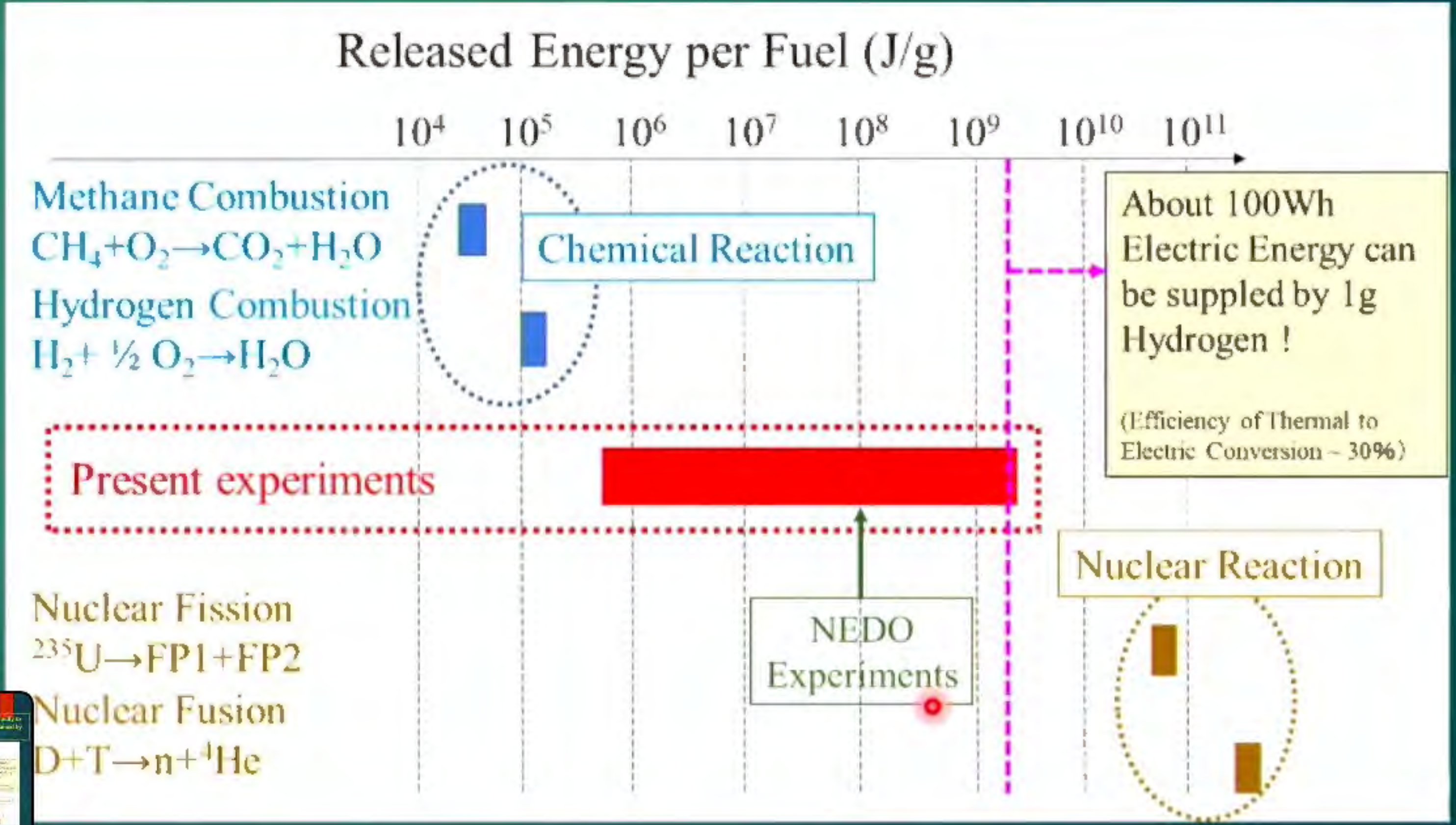
No.	Sample	Gas pressure	Initial temp.	Temp. rise	Heat generation	
3	Pd-Ni-Zr 3.0 g	0.12 MPa	95 °C	9.1 K	41.5 J	1.06 W
4	Pd-Ni-Zr 3.0 g	0.9 MPa	240 °C	35.0 K	159 J	17.7 W
5	Pd-Ni-Zr 3.0 g	5 MPa	295 °C	115 K	524 J	105 W

Kobayashi et al., *J. Condensed Matter Nucl. Sci.* 38 (2024) 96–107

2.3 Overview of university research: Tohoku Univ. (1)

Ni-based nanoscale multilayer film was preloaded with hydrogen gas and heated rapidly to move hydrogen and induced anomalously large heat generation that cannot be explained by any known chemical processes.

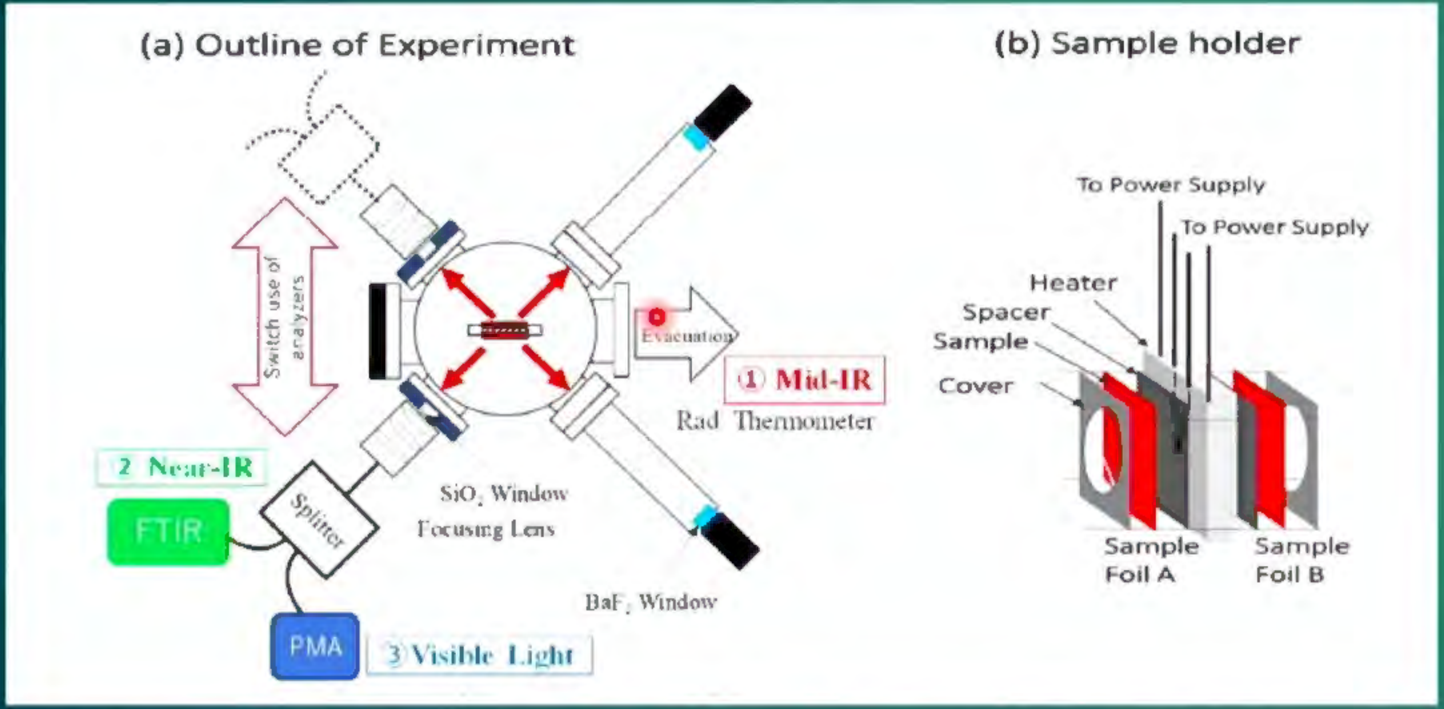




2.3 Overview of university research: Tohoku Univ. (2)

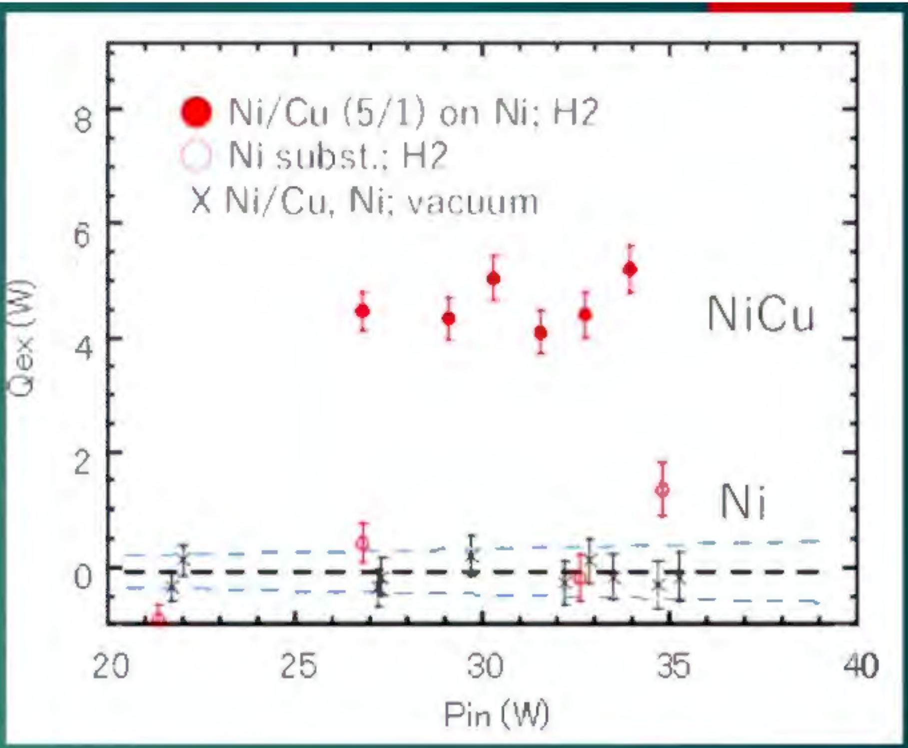
Photon radiation calorimetry

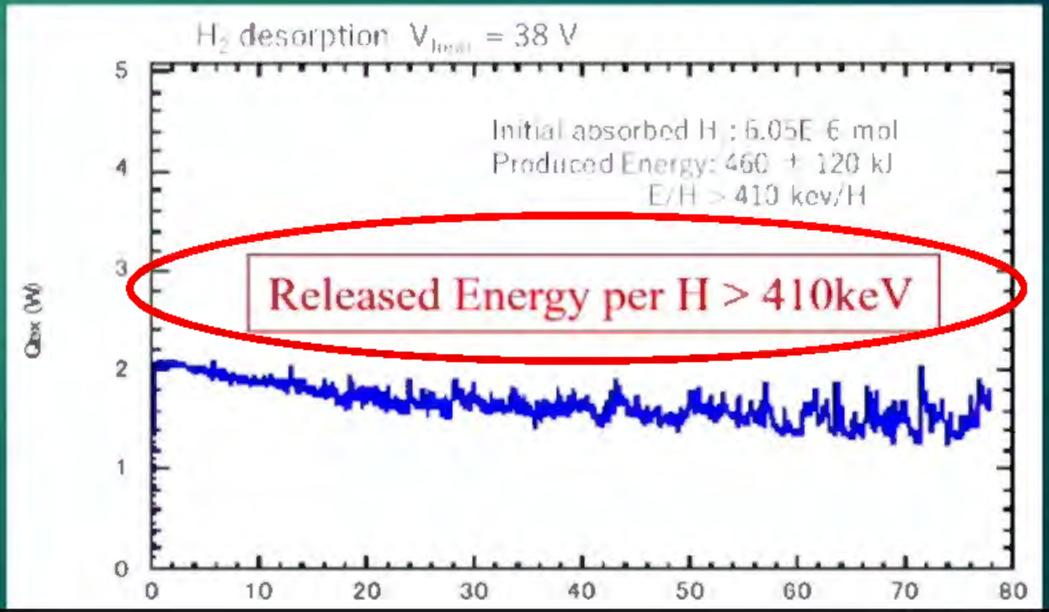
0.3μm to 5.5 μm : 0.22 to 4.13 eV



J. Kasagi et.al, *J. Condensed Matter Nucl. Sci., 39: 210-219 (2025).*

Collaboration with Clean Planet, Inc.





5. TEET Project (2023-2025)

1:51:23

2.4 TEET Project 2023.4~2027.3

TEET
The Thermal & Electric Energy Technology Foundation

Budget: 0.2 Billion Yen (1.43 M Dollar, 1.25 M Euro)
Funded by TEET (The Thermal & Electric Energy Technology Foundation)

Title: New Hydrogen Energy Innovation

Organizations: Kyushu Univ, Kobe Univ, Waseda Univ, Tohoku Univ,
Iwate Univ. Yokohama City University

Objective: Development of new hydrogen energy as a clean, safe and compact energy source

KYUSHU UNIVERSITY (~2025.3)

26p-3 KOBE UNIVERSITY

29a-1 WASEDA University

26p-2 TOHOKU UNIVERSITY

27p-1 YOKOHAMA CITY UNIVERSITY (2025.4~)

岩手大学 IWATE UNIVERSITY

Research currently underway

1:51:53

Possible CMNS Business Opportunities
⇒ Impact on Social Change

CMNS
Compact
CO_2 Free
Low H_2
consumption

Stationary

Heat sources for steel and chemical manufacturers

Heat Source

Mobile

Heat source for EV and EV power, ship power, aircraft power, drone power, etc.

Car
Ship
Drone

Stationary

Cogeneration system for buildings, etc.

Data Center

Stationary

Mobile

Household power supply, robot power supply

Robot

Time Axis

1:54:57

My current understanding of our field

A lot of experimental results have been obtained and theoretical clarification are in progress!

→

Experimental results up to now are **still weak** to declare it **“Nuclear”.**

→

Acceptance by the academic community and the general public is **critical**.

1:56:47

Research and Development Strategy

1) Develop the most **practical and feasible** method based on previous conducted studies.

2) Demonstrate that the method can be put to **practical use**.

3) **Clarification** of the reaction mechanism.

1), 2) →

People in the world would recognize the usefulness of research in this field, funding will be available to expand the number of researchers.

Concluding Remarks

Research in CMNS has been continuously and actively conducted in Japan.
Experiments on the adsorption and desorption of deuterium and hydrogen by nano-sized metal composite particles and multilayer metal complexes have been the mainly focused.

1. Heat generation is observed not only with deuterium but also with hydrogen. Reproducibility is fairly good.
2. Heat generation that cannot be explained by chemical reactions, and observed excess power implies that it is possible to be a nuclear origin.

In my opinion,

- Researchers in the fields of condensed matter physics and condensed matter chemistry, which have been lacking so far, should be brought into our community and systematic research should be conducted to clarify what is happening.
- At the same time, it is important to demonstrate that this phenomenon can be put to practical use as a new energy source.

UNIWERSYTET SZCZECIŃSKI

European Commission

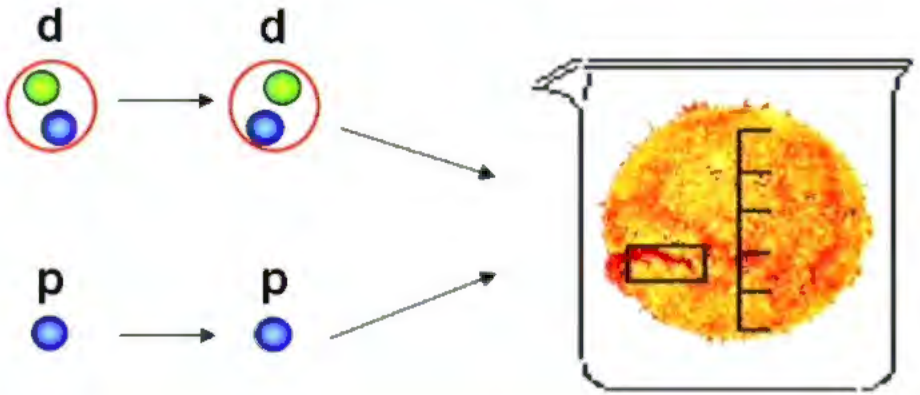
CLEAN HME

EUROPEAN UNION

Results of the European CleanHME Project

01/08/2023 – 31/01/2025

for CleanHME Consortium

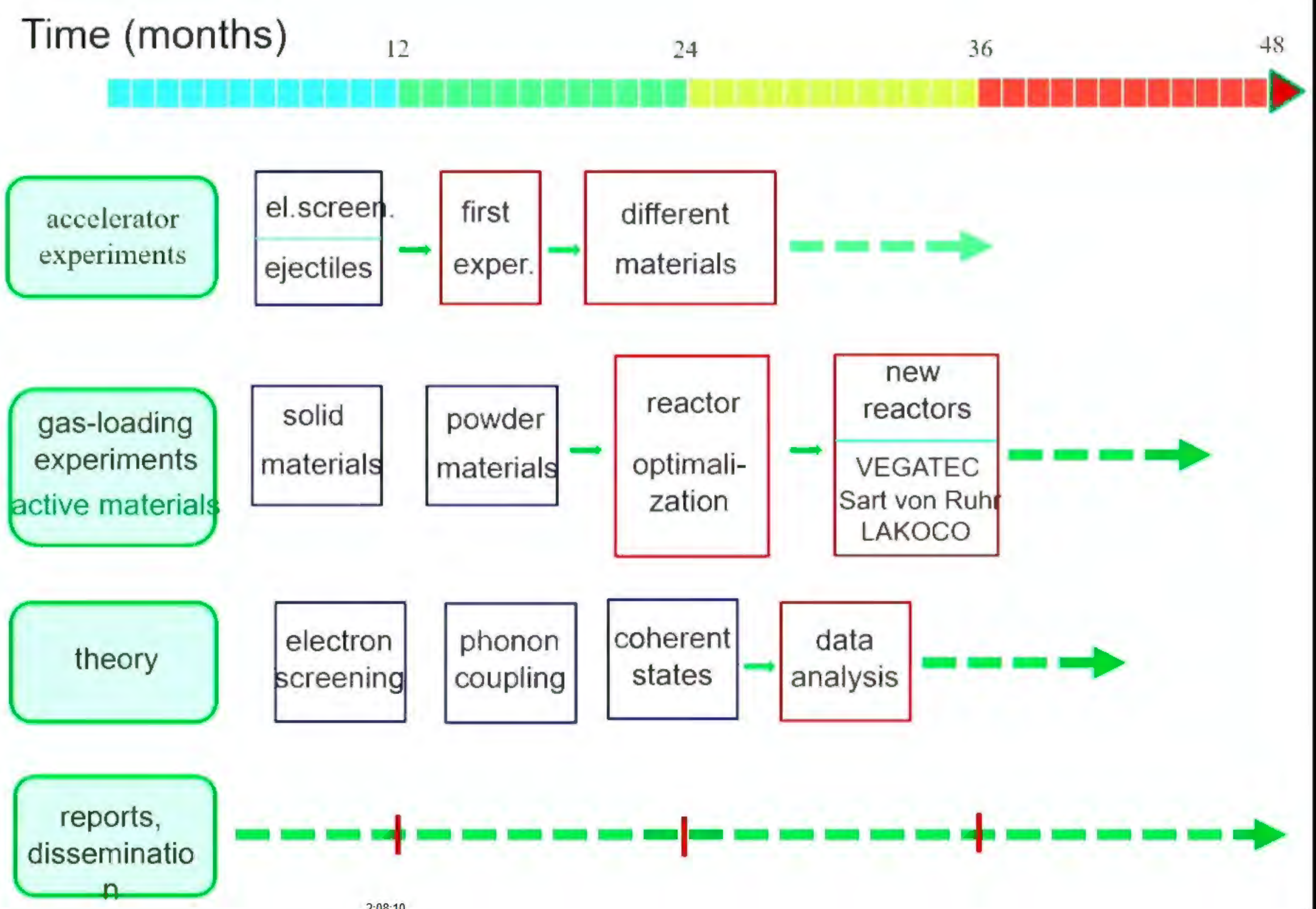


ICCF-26, Morioka, Japan, May 26-29, 2025

Konrad Czerski

Взгляд из Европы.
Проект CLEN HME

Проф. К. Черски


Time (months)
12
24
36
48
accelerator experiments
el.screen.
ejectiles
first exper.
different materials
gas-loading experiments
active materials
solid materials
powder materials
reactor optimali-zation
new reactors
VEGATEC
Sart von Ruhr
LAKOCO
theory
electron screening
phonon coupling
coherent states
data analysis
reports, disseminatio n

Clean Power from Hydrogen-Metal Systems

– CleanHME –

Участники Проекта

Gas-Loading Facilities

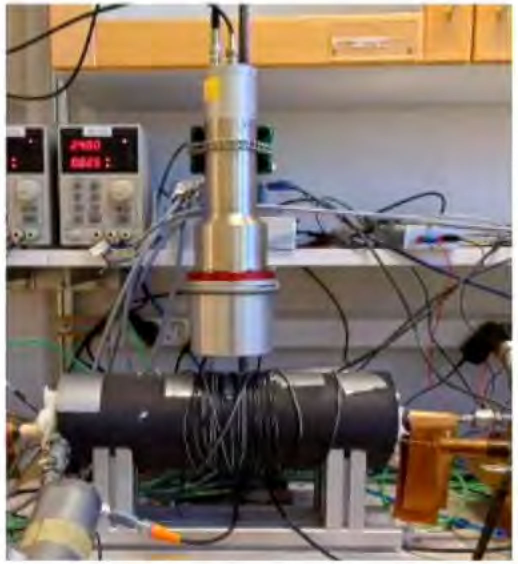
VEGATEC (Fance)
Calorimetry, powders

Uppsala University (Sweden)
Calorimetry, powders

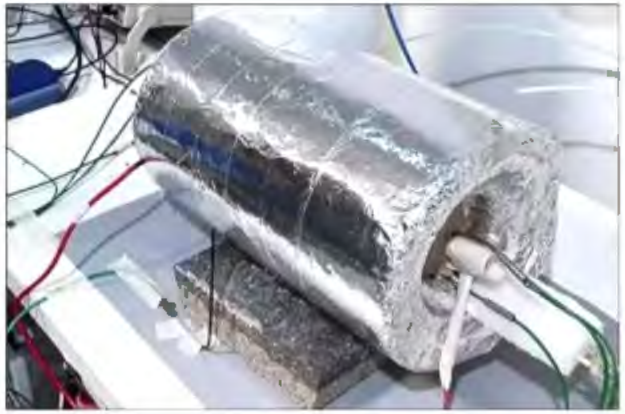
FutereOn (Italy)
Thermometry, powders

IFNS (Italy)
Thermometry, bulk materials

Sienna University (Italy)
Thermometry, pow



Neutron detector above the calorimeter at the Uppsala University



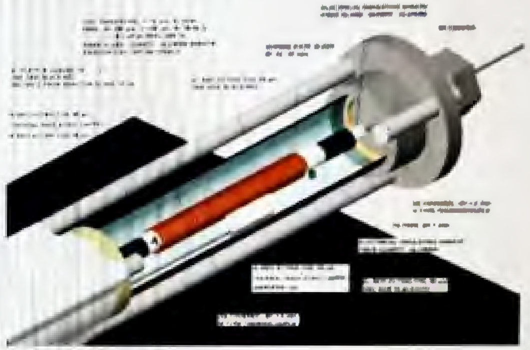
Reactor of FutureOn

Методы исследований Диагностические средства

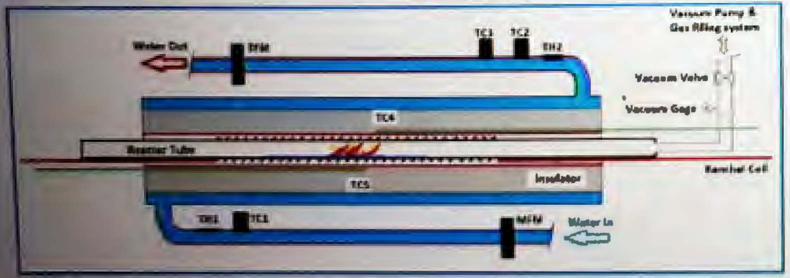
Calometry and Thermometry

FutureOn,Italy

INFN, Italy



Uppsala University, Sweden



Lakoco, Belgium

Sart von Rohr, France

Accelerator Facilietes

University of Szczecin (Poland)
Very low energies

Joseph Stefan Institute (Slovenia)
Inverse kinematics

FutereOn (Italy)
Pulsed beam

University of Iceland (Iceland)
Laser beam

JSI Slovenia

U Iceland

Laboratory of Nuclear and Medical Physics

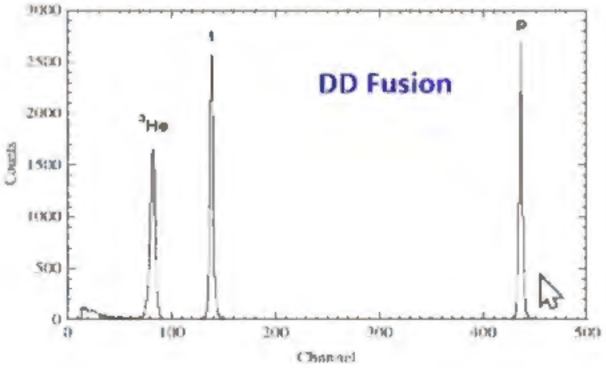
accelerator with ultra high vacuum

ECR ion source
low emittance , high current,
light ions – a few mA

Target Chamber:

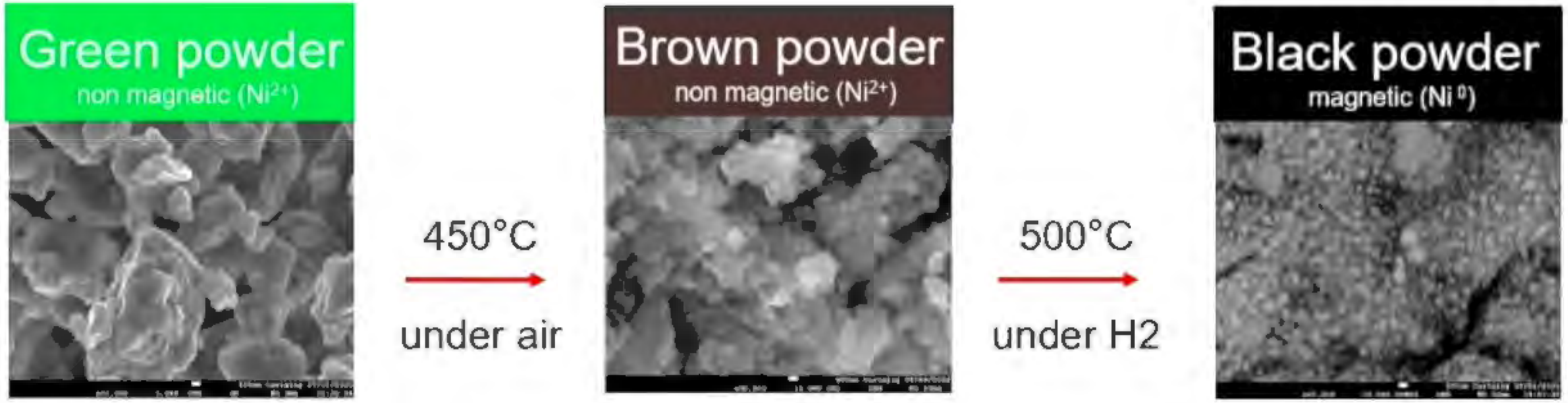
Electron Auger Spectroscopy

mass spectroscopy



10 $^{-11}$ mbar

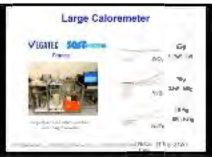
Materials II



Very simple synthesis for active materials for LENR

Ni/Cu, Ni/Fe, Ni/Bi, ZrO_2, Ni/Cu+ThO_2

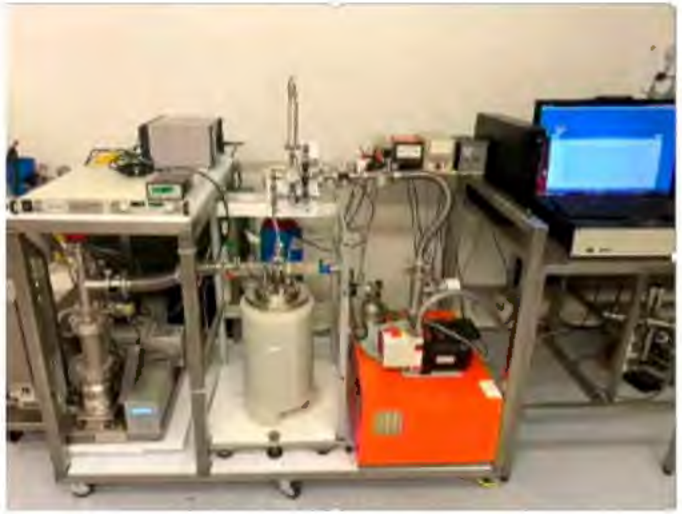
C. Le Roux, http://www ... wp-content/uploads/2023/02/Hydrotalcite-Synthesis.pdf



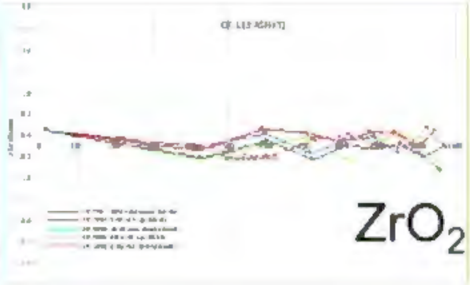
Large Caloremeter

VEGATEC sart von Rohr

France



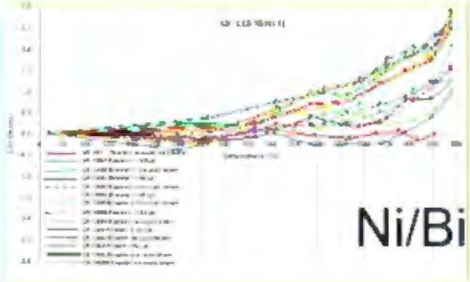
Large Quartz cell able to contain up to 1kg of powder



ZrO_2

62g

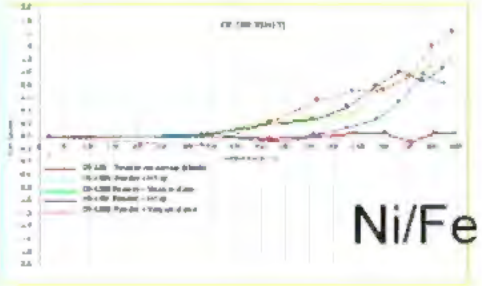
0.0±0.5 W



Ni/Bi

12g

24W / 100g



Ni/Fe

10.6g

15W / 100g

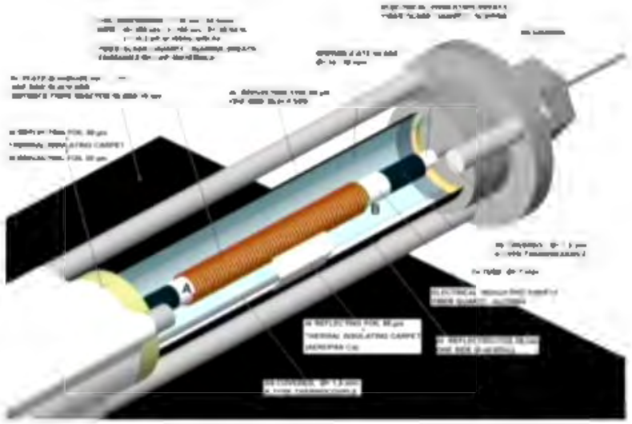
J.-P. Biberian et al., J. Cond ... Nucl. Sci. 38, 186-195 (2024).

Ni/Cu 14.6 g 21W / 100g

2:13:05

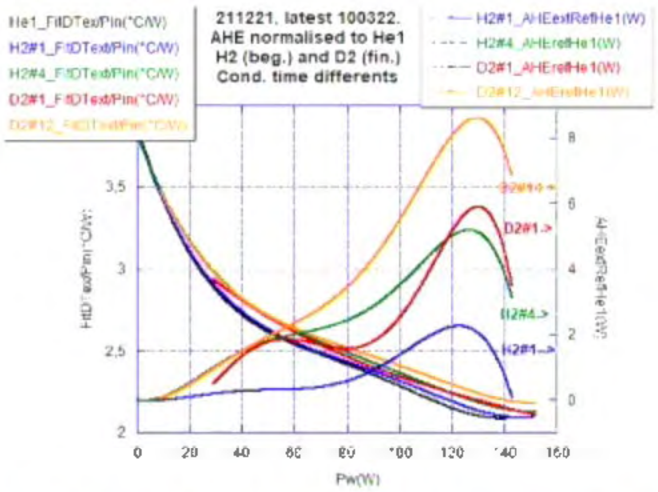
Thermometry

INFN, Italy



coaxially-coiled Constantan wires

up to 900°C



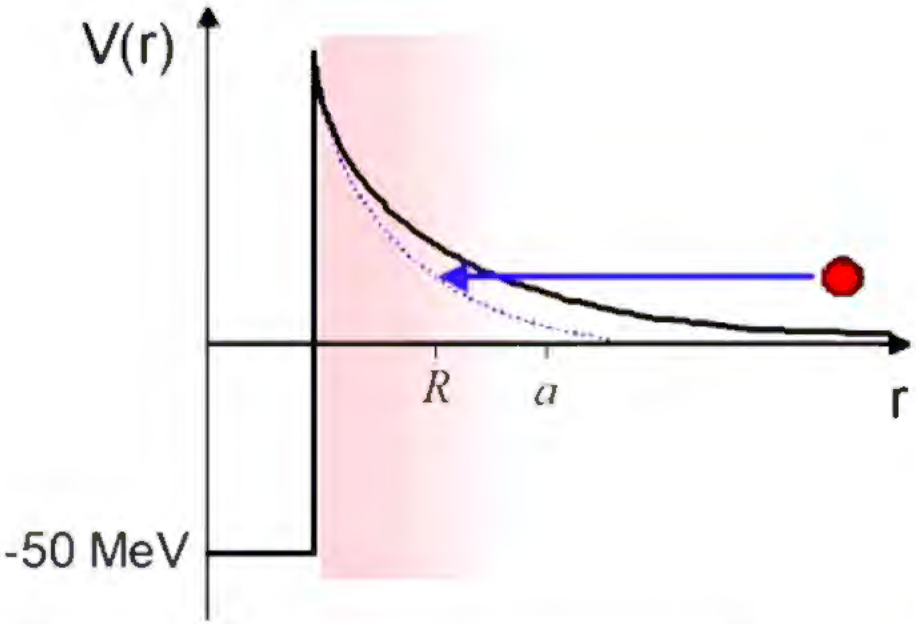
AHE under H_2 to D_2. The best result provides **exp. D2#14**: over **9 W** under **D_2**. To be compared with **5 W** under **H_2** (**exp. H2#4**).

New pulse generator – excess power

order of magnitude more than in powder experiments

Accelerator Experiments:

Electron Screening



$$V(r) = \frac{Z_1 Z_2 e^2}{r} \exp(-r/a)$$

$$\approx \frac{Z_1 Z_2 e^2}{r} - U_e$$

$$\boxed{U_e = \frac{Z_1 Z_2 e^2}{a}}$$

screening energy

$$P(E) = \sqrt{\frac{E_G}{E}} \exp\left(-\sqrt{\frac{E_G}{E}}\right)$$

s-wave penetration factor

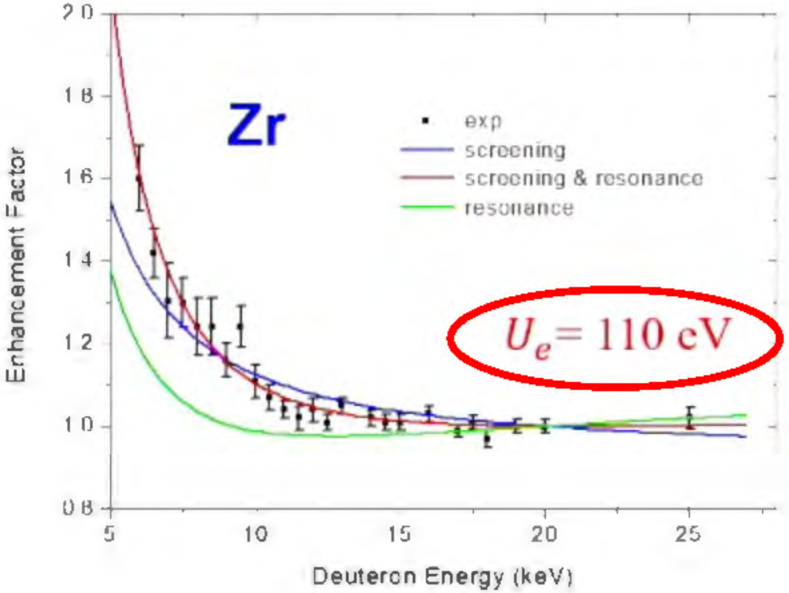
$$P(E) \longrightarrow P(E + U_e)$$

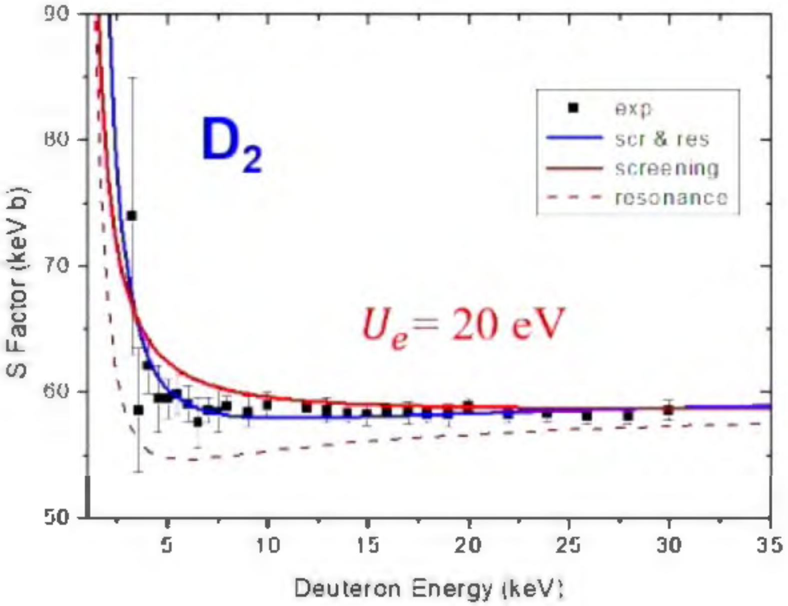
model independent approach

Accelerator Experiments:

Electron Screening in DD Fusion

Учет вкладов экранировки протонов, наличия резонанса в гелии





$$\sigma_{scr}(E) = \frac{1}{\sqrt{E(E+U_e)}} S(E)\exp\left(-\sqrt{\frac{E_G}{E+U_e}}\right) = \frac{1}{\sqrt{EE_G}} P(E+U_e)S(E)$$

Europhys. Lett. 2016, … etters) 2022

Accelerator Experiments:

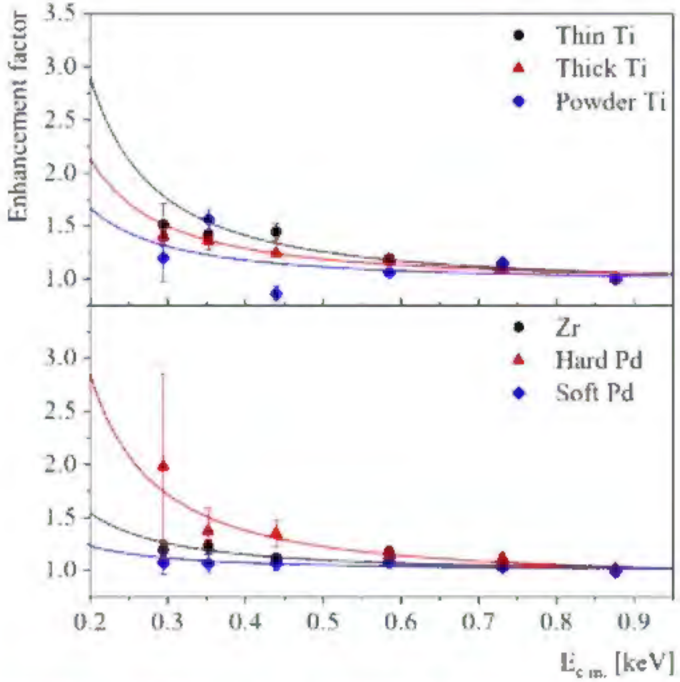
Electron Screening in Inverse Kinematics

Josef Stefan Institute, Slovenia

Electron screening energies inverse kinematics

$^{2}H(^{19}F,p)^{20}F$ reaction

in different environments



cold rolled Pd: large screening energy

enhancement factor

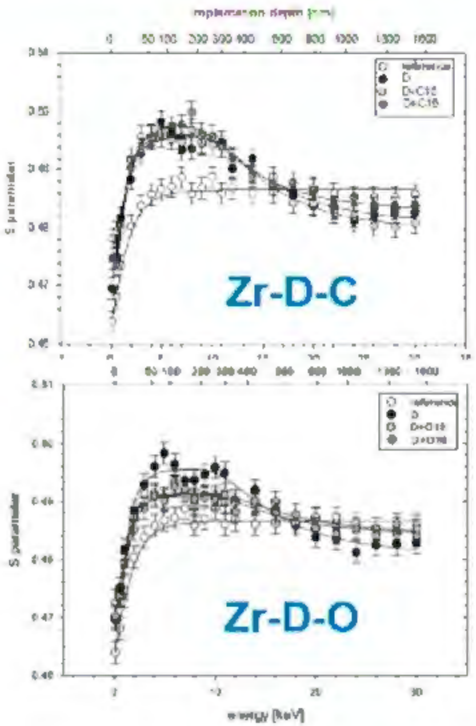
$$f(E) = \frac{\sigma(E+U_e)}{\sigma(E)}$$

A. Cvetinović et al., *Physi* ... (2023) 137684

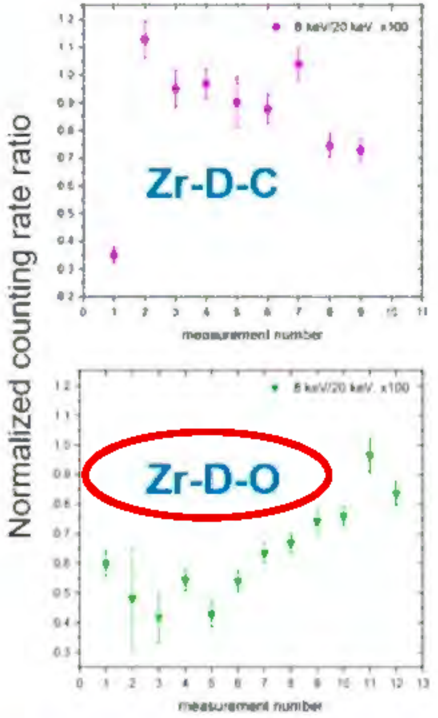
Screening Energy: Oxygen Contamination

Влияние примеси кислорода

Positron Annihilation Spectroscopy



Screening Energy Determination



$U_e \searrow$ 200eV

$U_e \nearrow$ 500eV

Deuterons produce large
number of v ancy

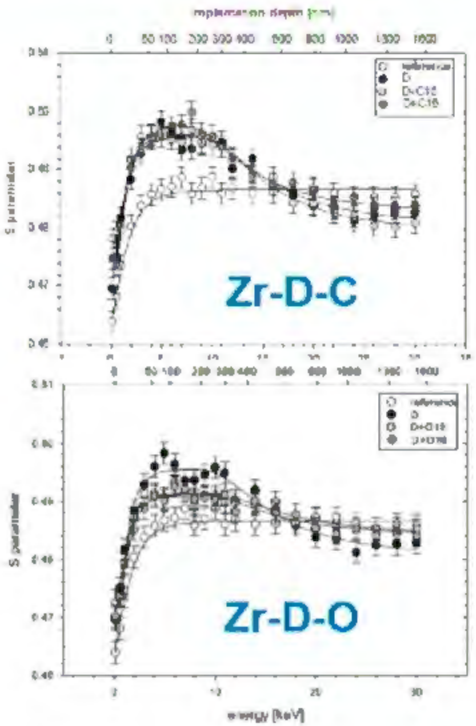
A. Kowalska et al., *Materials* 16 (2023) 6255
A. Kowalska et al., *Materials* 18 (2025) 1331

Increase of ef on mass

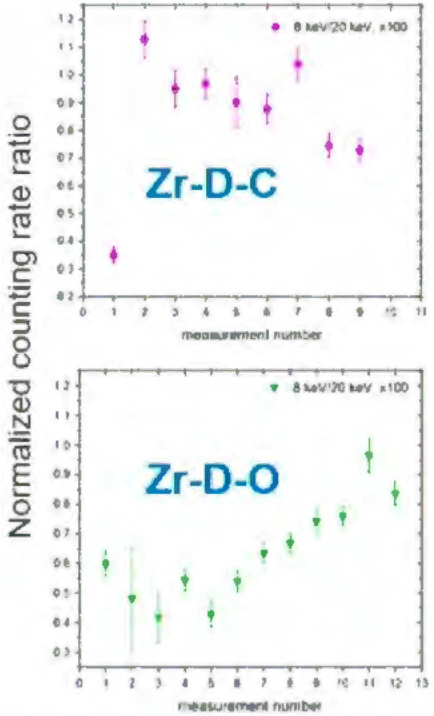
$$U_e \sim \sqrt{m_{eff}}$$

Screening Energy: Oxygen Contamination

Positron Annihilation Spectroscopy



Screening Energy Determination



$U_e \searrow$ 200eV

$U_e \nearrow$ 500eV

Deuterons produce large number of vacancies, vacancy difusion

A. Kowalska et al., *Materials* 16 (2023) 6255
A. Kowalska et al., *Materials* 18 (2025) 1331

Increase of effective electron mass $U_e \sim \sqrt{m_{eff}}$

Theory of DD Reactions:

Room Temperature

Resonance cross section:

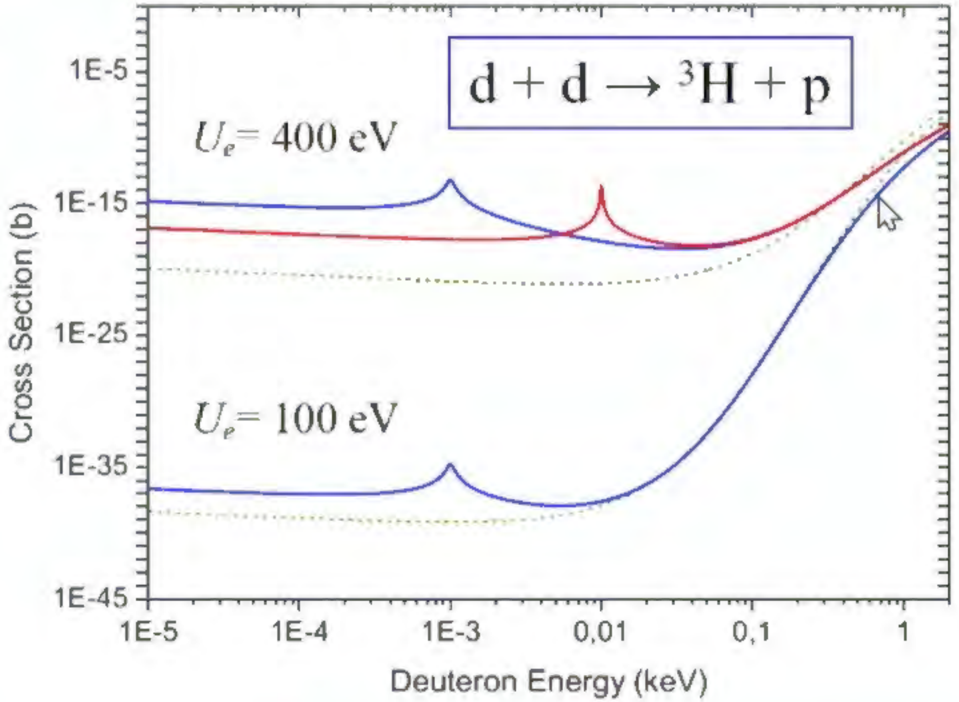
$$\sigma(E) = \frac{\pi}{k^2}\frac{\Gamma_d(E)\,\Gamma_p}{(E-E_R)^2+\frac{1}{4}\Gamma_\alpha^2}$$

Resonance width also depends on U_e

$$\Gamma_d(E) = 2kP(E+U_e)\,|\gamma|^2$$

$$\boxed{\Gamma_\alpha = 0.1\ eV}$$

100g ⇨ 10kW



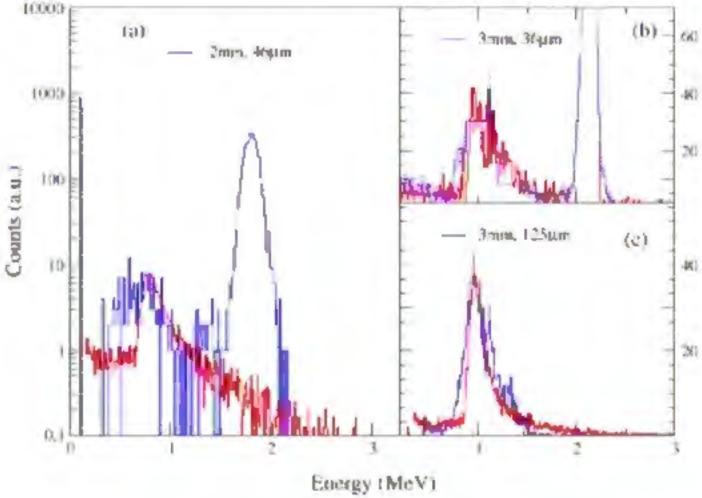
$$\Gamma_\alpha = \Gamma_d + \Gamma_p + \Gamma_n + \Gamma_{pc}$$

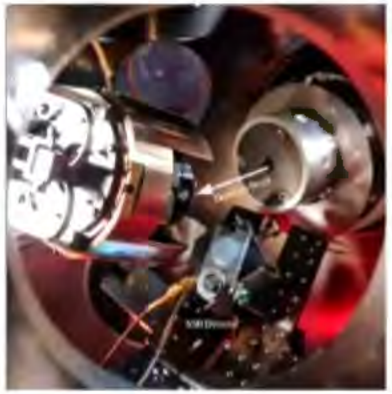
total resonance width

Phys. Rev. C Letters 2022

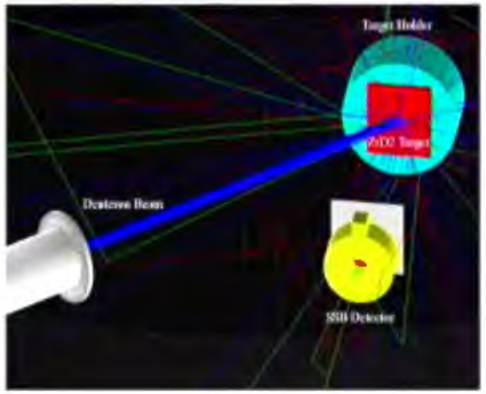
Observation of e^+e^- Emission

Geant 4 simulations

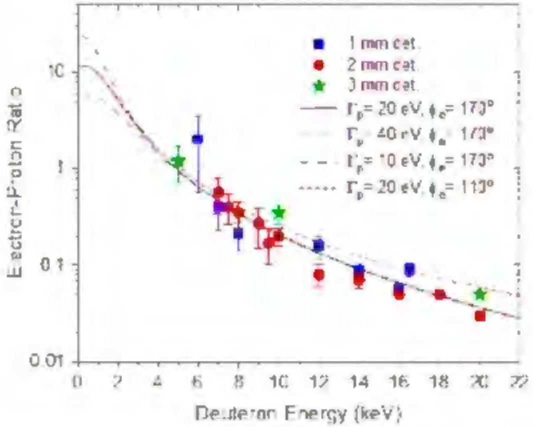


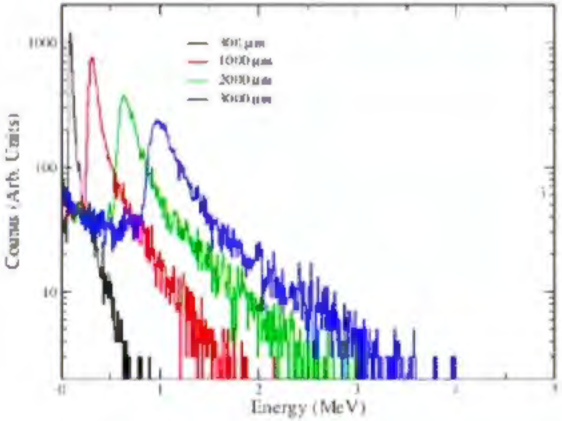


(a)



(b)



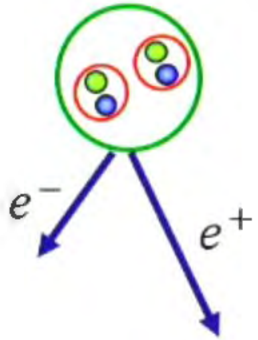


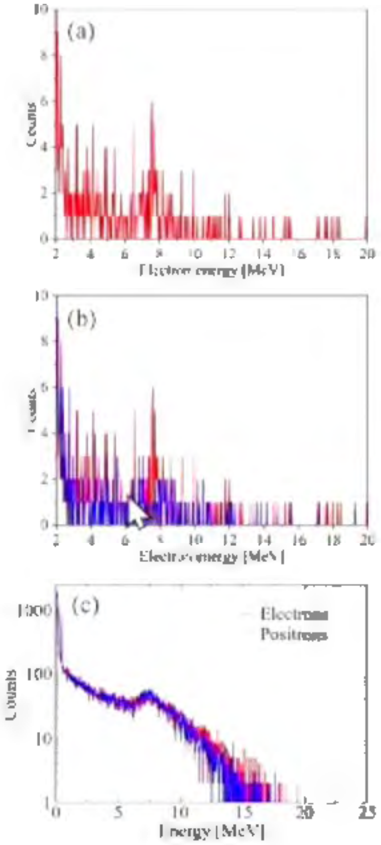
Phys. Rev. C (Lett.) 2024, submitted to *Phys. Rev. X* *Measurement* 2024

Underground Measurements

Josef Stefan Institute, Slovenia

Internal Pair Production





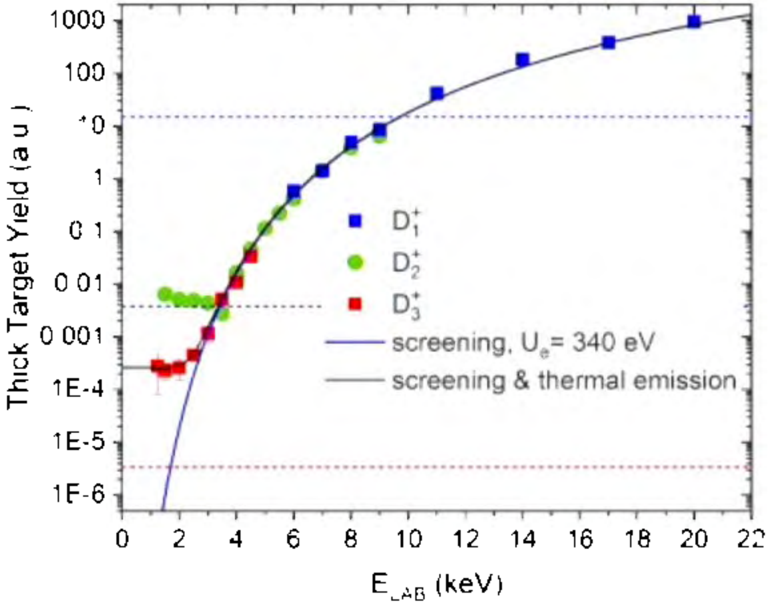
with and without
deuteron
beam (ion gun)

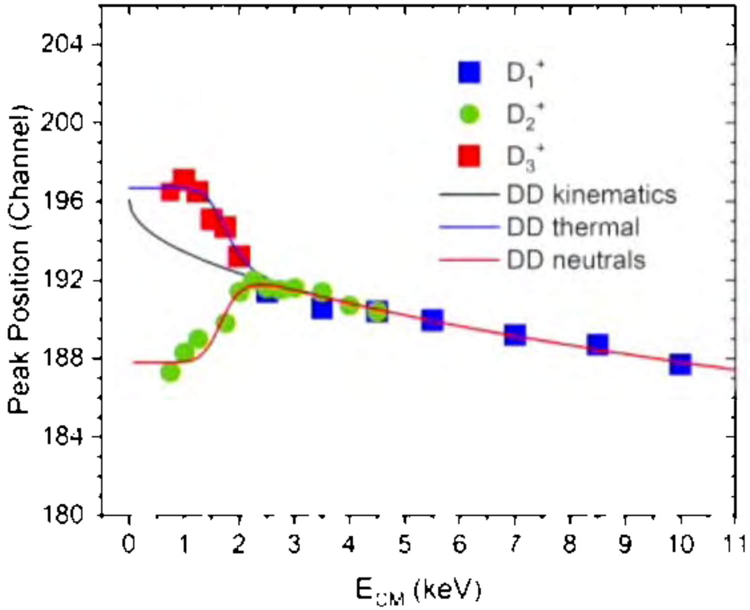
cross section ≈ 10^{-18} b

M. Lipoglavsek et al., submitted to Phys. Lett. B

The $^2H(d,p)^3H$ Reaction in Zr
at Extremely Low Energies

3 MeV protons, $U_e = 340$ eV



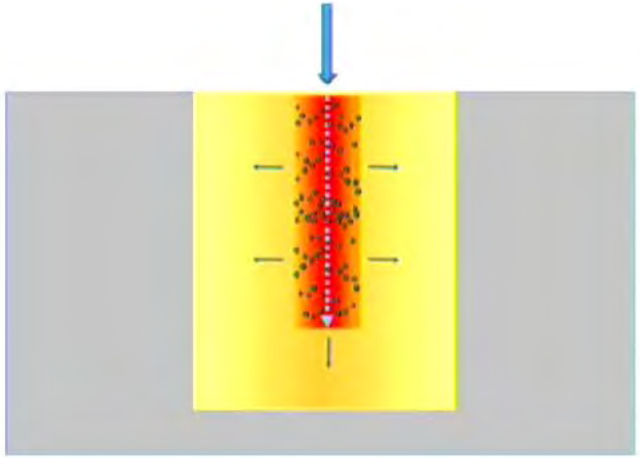


The lowest deuteron energy measured 1.25 keV (0.60 keV in CMS)

Thermal DD Fusion !

Submitted to *Nature Comm.*, 2024

Thermal DD fusion in Ion Tracks



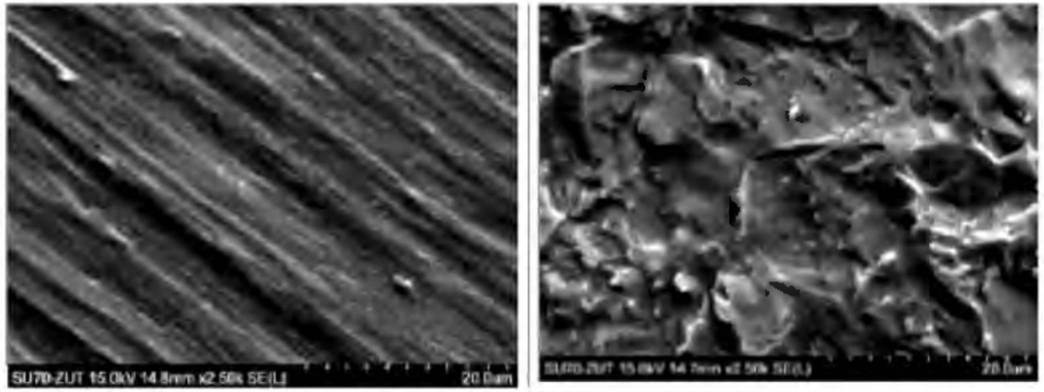
Expanding ion track

$T_i = 2600°K$

$T_f = 300°K$

phonon lifetime

$\tau = 100 \cdot 10^{-12}$ s



Scanning electron microscope (SEM) images of the Zr target before (left) and after (right) deuteron irradiation.

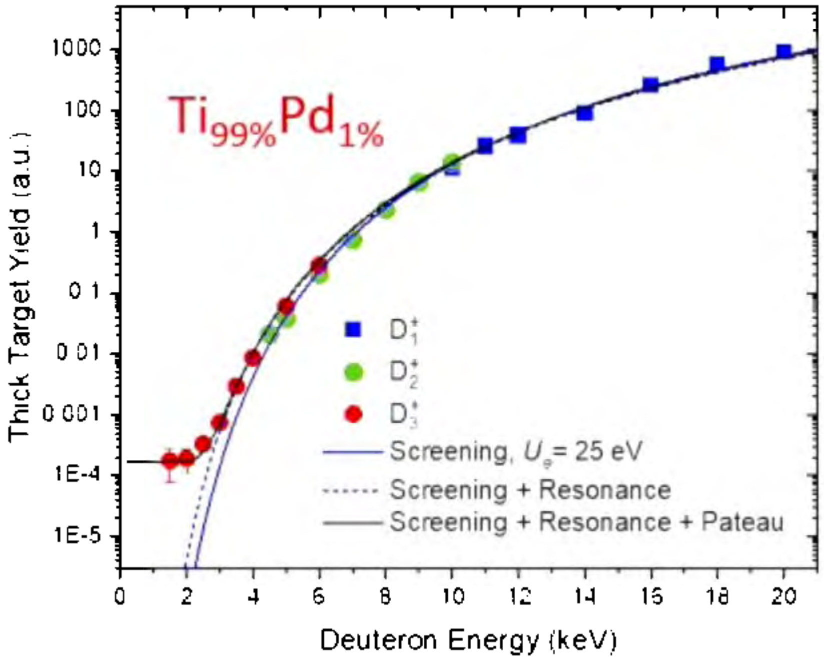
melting point

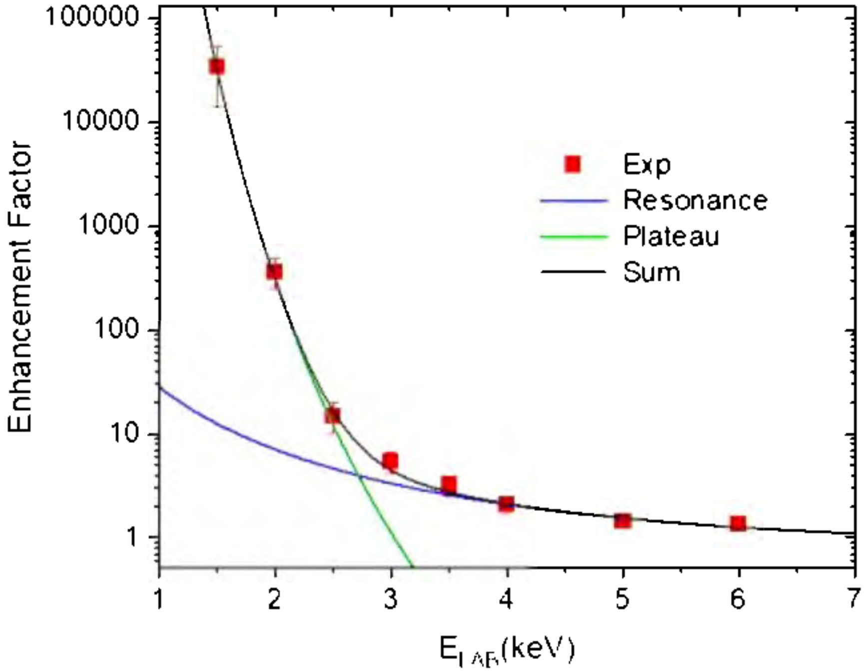
$T_m = 2150°K$

Submitted to *Nature Comm.*, 2024

The $^2H(d,p)^3H$ Reaction in TiPd

$U_e = 25$ eV





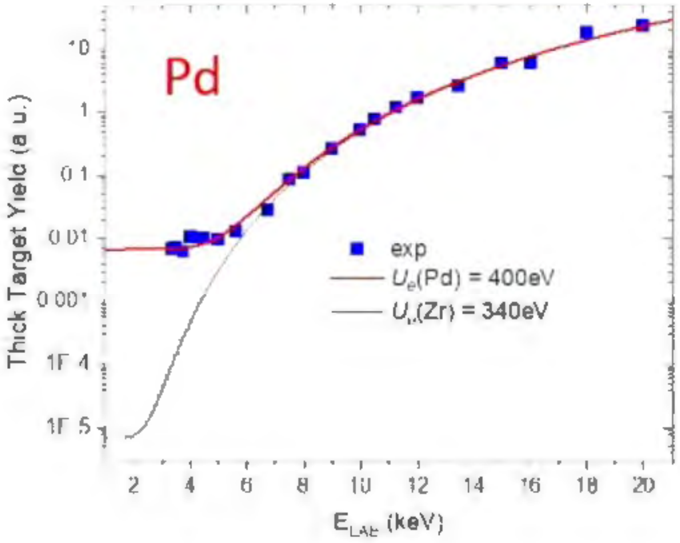
Thick oxide layer at the surface ⇨ small screening energy

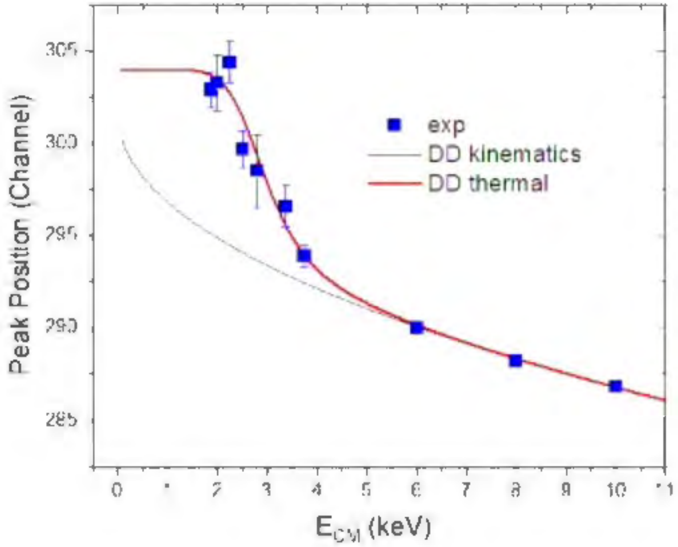
⇨ in ion tracks metallic phase with defects

Preliminary results, to be published, 2025

The $^2H(d,p)^3H$ Reaction in Pd

$U_e = 400$ eV





Yield plateau for Pd is 3 orders of magnitude higher than for Zr:

Pd is a better material for cold fusion

Conclusions

1. Heat excess in powder and bulk materials

Electron screening locally enhanced by impurities and crystal defects

nuclear reaction rates at room temperature can change dramatically by 40 orders of magnitude, materials of high screening energy needed.

2. 0^+ threshold resonance in ^{4}He

Balance between the resonance and electron screening

explains ^{4}He production and increases reaction rates at room temperature up to 7 orders of magnitude, changes the branching ratio, internal e+e- pair production dominates.

3. Demonstration of the cold fusion in accelerator experiments

Consistent DD fusion theory at thermal energies exists.
PP fusion theory still missing. Why is PP so close to DD?

Выводы к Части 1

- На конференции отмечена важность
- проведения демонстрационных экспериментов и проверка их со стороны независимых экспертов для ***преодоления недоверия*** **со стороны «большой»** науки и коммерческого сообщества.
- Важность публикации основных результатов, полученных в исследованиях по физике LENR в ведущих научных журналах
- Подчеркнуто наличие значительного **недофинансирования исследований в области LENR физики**
- Представлены **10 основных компаний-лидеров** в мире по созданию LENR реакторов коммерческого типа. Сообщается о намерении этих компаний начать этап коммерциализации таких реакторов. На первом этапе планируется использовать эти реакторы для получения тепловой энергии
- Подчеркнута **важность создания дешевого топлива** (металлических нано-порошков) для создания коммерческого LENR реактора)

Выводы к Части 1. Продолжение

- Перечислены основные экспериментальные и теоретические результаты, полученные в международных Программах в настоящее время
- **Экранировка протонов** малых энергий в металлических нано-порошках и металлических нано-пленках (композитах).
- Наличие **низколежащих резонансов в гелии**
- **Трансмутация начальных химических элементов и изменении их изотопного состава**.
- Выделении значительной **удельной тепловой энергии** в газонаполненных LENR реакторах. Ее величина может достигать **400 КэВ/атом водорода**
- Разработаны новейшие диагностические методы для исследования физических процессов в LENR реакторах, в том числе
- **Проточные калориметры** высокого разрешения,
- **Полимерные детекторы** для изучения треков заряженных частиц
- **Пирометры** для измерения нестационарных потоков оптического и ИК-излучений
- **Ускорители потоков протонов** (дейтонов, тритонов) малых энергий (0.10-10 КэВ)