# DOCUMENTATION OF FRANCESCO CELANI'S RESEARCH AND OTHER CONTRIBUTIONS TO THE COLD FUSION FIELD

*A PROJECT OF THE LENR RESEARCH DOCUMENTATION INITIATIVE*

**Second Draft Report**


Franceso Celani, Ph.D.
Associated Researcher, Retired
Instituto Nazionale di Fisica Nucleare
Frascati, Italy

Team Leader
CleanHME
European Union

Thomas W. Grimshaw, Ph.D.
LENRGY, LLC
Austin, Texas, USA





July 31, 2023

# Contents

# 1 Introduction

Cold fusion (CF) was announced on March 23, 1989, by Dr. Martin Fleischman and Dr. Stanley Pons. The immense potential energy benefits of CF (also referred to as Low Energy Nuclear Reactions, LENR) were immediately recognized. Humankind's need for a source of cheap, clean, inexhaustible, and safe energy seemed to be permanently satisfied. However, cold fusion was rejected by mainstream science within a year or so, and it remains highly marginalized to this day. On the other hand, the phenomenon has continued to be rigorously pursued by many investigators in several countries. The mounting evidence for the reality of cold fusion shows that its potential benefits may yet be realized.

Because it is a "pariah" science, cold fusion has attracted relatively few new investigators to the field. Many of the researchers became active in the early months and years after the 1989 announcement. Now more than 30 years later many of these investigators are leaving the field for retirement or health reasons. The results of their many years of cold fusion investigation are at risk of being lost, which would be extremely unfortunate not only for the field, but also potentially for humanity.

An initiative is underway by Dr. Thomas Grimshaw's LENRGY LLC to mitigate the risk of loss of research records of cold fusion investigators. Its objectives are to collect, organize, document, and archive these records. The LENR Research Documentation Initiative (LRDI) assists researchers to ensure that their efforts are preserved and to keep the records available for additional analysis and interpretation. The LRDI is described in article in Infinite Energy[1] and the LENRGY website[2].

Dr. Francesco Celani (Figure 1-1) has conducted research in LENR starting within a few days after the March 23rd announcement in 1989. He conducted his experiments while at Italy's National Institute for Nuclear Research (INFN) until his retirement in about 2017. Fortunately, he was able to continue his LENR work at his lab on the INFN campus after he retired and up to the present. Several external collaborators have, since 1983, helped him in developing

[1] Grimshaw, T., 2020. Documenting Cold Fusion Research: Preserving a Vital Asset for Humankind. Infinite Energy, Issue 150, March/April 2020, p. 9-13.

[2] LENRGY: Pursuing the Benefits of Cold Fusion Realization. http://lenrgyllc.com/documenting-research/.

experiments. Collaborators have been mainly physics and chemistry experts usually working for a laboratory or in academia. Pietro Cerreoni currently works with Dr. Celani in conducting LENR experiments.

*Figure 1-1*

*Dr. Celani in His Lab on the INFN Campus, Frascati, Italy*
*Photo Taken June 2023*

A project is being performed with Dr. Celani under the umbrella of the LRDI to document his research and other contributions to the LENR field. The scope of the Celani LENR Research Documentation Project (CLRDP) includes his publications and presentations, his LENR laboratory and lab notebooks, a LENR experiment in the lab, an interview regarding his long experience in research of the phenomenon, his electronic and hardcopy files, and his collection of books and related items in his library. Site visits for the CLRDP took place at his lab on September 2022 and June 2023. A preliminary draft report dated January 23, 2023 has previously been submitted to Dr. Celani.

# 2 Publications, Presentations and Reports

Dr. Celani has published many papers on his cold fusion research going back to the beginnings of the field in 1989. His papers included on Jed Rothwell's LENR-CANR.org library website[3], as well as his own website as described in Section 10, are listed in Table 2-1.

*Table 2-1.*

*Dr. Celani's Publications, Presentations and Reports*

| No | First Author | Year | Description | Avail? |
|---|---|---|---|---|
| 1 | Celani, F. | 1989 | Celani, F., et al., Preliminary Measurements on Electrolytic Cold Fusion at Underground Gran Sasso Laboratory. 1989. | |
| 2 | Celani, F. | 1990 | Celani, F., et al. Measurements in the Grans Sasso Laboratory: Evidence for Nuclear Effects in Electrolysis With Pd/Ti and Different Tests with Deuterium Hight-Temperature Superconductors. in Anomalous Nuclear Effects in Deuterium/Solid Systems, "AIP Conference Proceedings 228". 1990. Brigham Young Univ., Provo, UT: American Institute of Physics, New York. | |
| 3 | Celani, F. | 1990 | Celani, F., et al., Further measurements on electrolytic cold fusion with D2O and palladium at Gran Sasso Laboratory. Fusion Technol., 1990. 17: p. 718. | |
| 4 | Celani, F. | 1991 | Celani, F., et al. Search for Neutron Emission from Deuterided High Temperature Superconductors in a Very Low Background Environment. in Second Annual Conference on Cold Fusion, "The Science of Cold Fusion". 1991. Como, Italy: Societa Italiana di Fisica, Bologna, Italy. | Yes |
| 5 | Celani, F. | 1992 | Celani, F., et al. Measurement of Excess Heat and Tritium During Self-Biased Pulsed Electrolysis of Pd-D2O. in Third International Conference on Cold Fusion, "Frontiers of Cold Fusion". 1992. Nagoya Japan: Universal Academy Press, Inc., Tokyo, Japan. | Yes |
| 6 | Celani, F. | 1992 | Celani, F., et al., Search for enhancement of neutron emission from neutron-irradiated, deuterated, high-temperature superconductors in a very low background environment. Fusion Technol., 1992. 22: p. 181. | |
| 60 | Stella, B. | 1992 | Stella, B., et al. The FERMI Apparatus and a Measurement of Tritium Production in an Electrolytic Experiment. in Third International Conference on Cold Fusion, "Frontiers of Cold Fusion". 1992. Nagoya Japan: Universal Academy Press, Inc., Tokyo, Japan. | Yes |
| 61 | Stella, B. | 1992 | Stella, B., et al. Evidence for Stimulated Emission of Neutrons in Deuterated Palladium. in Third International Conference on Cold Fusion, "Frontiers of Cold Fusion". 1992. Nagoya Japan: Universal Academy Press, Inc., Tokyo, Japan. | Yes |
| 7 | Celani, F. | 1993 | Celani, F., et al. High Power ?s Pulsed Electrolysis for Large Deuterium Loading on Pd Plates. in Fourth International Conference on Cold Fusion. 1993. Lahaina, Maui: Electric Power Research Institute 3412 Hillview Ave., Palo Alto, CA 94304. | Yes |
| 8 | Celani, F. | 1994 | Celani, F., et al. D/Pd Loading Ratio up to 1.2:1 by High Power S Pulsed Electrolysis in Pd Plates. in International Symposium on Cold Fusion and Advanced Energy Sources. 1994. Belarusian State University, Minsk, Belarus: Fusion Information Center, Salt Lake City. | |

[3] A Library of Papers about cold fusion maintained by Jed Rothwell. https://lenr-canr.org/

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| 9 | Celani, F. | 1995 | Celani, F., et al. Numerical Simulation of Deuterium Loading Profile in Palladium and Palladium Alloy Plates From Experimental Data Obtained Using ?s Pulsed Electrolysis. in 5th International Conference on Cold Fusion. 1995. Monte-Carlo, Monaco: IMRA Europe, Sophia Antipolis Cedex, France. | Yes |
| 10 | Celani, F. | 1995 | Celani, F., et al. Study of Deuterium Charging Behavior in Palladium and Palladium Alloy Plates, Charging Surface Treatments, by ?s Pulsed Electrolysis. in 5th International Conference on Cold Fusion. 1995. Monte-Carlo, Monaco: IMRA Europe, Sophia Antipolis Cedex, France. | Yes |
| 11 | Celani, F. | 1995 | Celani, F., et al. High Power S Pulsed Electrolysis Using Palladium Wires: Evidence for a Possible "Phase" Transition Under Deuterium Overloaded Conditions and Related Excess Heat. in 5th International Conference on Cold Fusion. 1995. Monte-Carlo, Monaco: IMRA Europe, Sophia Antipolis Cedex, France. | Yes |
| 62 | Stella, B. | 1995 | Stella, B., et al., A high efficiency, low background neutron and gamma detector for cold fusion experiments. Nucl. Instrum. Methods Phys. Res. A, 1995. 355: p. 609. | |
| 12 | Celani, F. | 1996 | Celani, F., et al. New Kinds of Electrolytic Regimes and Geometrical Configurations to Obtain Anomalous Results in Pd(M)-D Systems. in Sixth International Conference on Cold Fusion, Progress in New Hydrogen Energy. 1996. Lake Toya, Hokkaido, Japan: New Energy and Industrial Technology Development Organization, Tokyo Institute of Technology, Tokyo, Japan. | Yes |
| 13 | Celani, F. | 1996 | Celani, F., et al. Observations of strong resistivity reduction in a palladium thin long wire using ultra-high frequency pulse electrolysis at D/Pd>1. in Sixth International Conference on Cold Fusion, Progress in New Hydrogen Energy. 1996. Lake Toya, Hokkaido, Japan: New Energy and Industrial Technology Development Organization, Tokyo Institute of Technology, Tokyo, Japan. | Yes |
| 14 | Celani, F. | 1996 | Celani, F., et al., Reproducible D/Pd ratio > 1 and excess heat correlation by 1-microsec-pulse, high-current electrolysis. Fusion Technol., 1996. 29: p. 398. | Yes |
| 15 | Celani, F. | 1996 | Celani, F., et al., Deuterium overloading of palladium wires by means of high power microsecond pulsed electrolysis and electromigration: suggestions of a "phase transition" and related excess heat. Phys. Lett. A, 1996. 214: p. 1. | Yes |
| 16 | Celani, F. | 1998 | Celani, F. Ultra high (over 1:1) H/Pd loading ratio using thin wires in acidic solution with addition of very low concentration impurities. in Italian Physical Soc. 1998. Salerno, Italy. | |
| 17 | Celani, F. | 1998 | Celani, F., et al. Preliminary Results with "Cincinnati Group Cell" on Thorium "Transmutation" under 50 Hz AC Excitation. in The Seventh International Conference on Cold Fusion. 1998. Vancouver, Canada: ENECO, Inc., Salt Lake City, UT. | Yes |
| 18 | Celani, F. | 1998 | Celani, F., et al. The Effect of g-b Phase on H(D)/Pd Overloading. in The Seventh International Conference on Cold Fusion. 1998. Vancouver, Canada: ENECO, Inc., Salt Lake City, UT. | Yes |
| 19 | Celani, F. | 1998 | Celani, F., et al. The Effect of Gamma-Beta Phase on H(D)/Pd Overloading. in ICCF7, Seventh International Conference on Cold Fusion. 1998. Vancouver, Canada: ENECO, Inc., Salt Lake City, UT. | |
| 20 | ~~Celani, F.~~ | ~~1998~~ | ~~Celani, F., et al. The Effect of Gamma-Bet Phase on H(D)/Pd Overloading. in ICCF7, Seventh International Conference on Cold Fusion. 1998. Vancouver, Canada: ENECO, Inc., Salt Lake City, UT~~. (Duplicate) | |

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| 21 | Celani, F. | 1999 | Celani, F., A study on the electrochemistry parameters to achieve reproducible high H/Pd and D/Pd vlues in relation to anomalous excess heat: proteobacteria contamination problematics. 1999. | |
| 51 | Marini, P. | 1999 | Marini, P., et al., Protocollo innovativo per l' ipercaricamento di catodi di Palladio con Idrogeno messo a punto all'INFN di Frascati, in 21mo Secolo. 1999. | Yes |
| 22 | Celani, F. | 2000 | Celani, F., et al. High Hydrogen Loading into Thin Palladium Wires through Precipitate of Alkaline-Earth Carbonate on the Surface of Cathode: Evidence of New Phases in the Pd-H System and Unexpected Problems Due to Bacteria Contamination in the Heavy-Water. in 8th International Conference on Cold Fusion. 2000. Lerici (La Spezia), Italy: Italian Physical Society, Bologna, Italy. | Yes |
| 55 | Spallone, A. | 2000 | Spallone, A., et al. New Electrolytic Procedure for the Obtainment of Very High H/Pd Loading Ratios. Preliminary Attempts for its Application to the D/Pd System. in 8th International Conference on Cold Fusion. 2000. Lerici (La Spezia), Italy: Italian Physical Society, Bologna, Italy. | Yes |
| 65 | Tripodi, P. | 2000 | Tripodi, P., et al., Temperature coefficient of resistivity at compositions approaching PdH. Phys. Lett. A, 2000. 276: p. 122. | |
| 23 | Celani, F. | 2002 | Celani, F., et al. Unexpected Detection Of New Elements In Electrolytic Experiments With Deuterated Ethyl-Alcohol, Pd Wire, Sr And Hg Salts. in JCF-4. 2002. Morioka, Japan. | Yes |
| 24 | Celani, F. | 2002 | Celani, F., et al., Evidence of anomalous tritium excess in D/Pd overloading experiments. 2002, Laboratori Nazionali Di Frascati. | Yes |
| 25 | Celani, F. | 2002 | Celani, F., et al. Electrochemical D loading of palladium wires by heavy ethyl-alcohol and water electrolyte, related to Ralstonia bacteria problematics. in The 9th International Conference on Cold Fusion, Condensed Matter Nuclear Science. 2002. Tsinghua Univ., Beijing, China: Tsinghua Univ. Press. | Yes |
| 26 | Celani, F. | 2002 | Celani, F., et al. Evidence of anomalous tritium excess in D/Pd overloading experiments. in The 9th International Conference on Cold Fusion, Condensed Matter Nuclear Science. 2002. Tsinghua Univ., Beijing, China: Tsinghua Univ. Press. | Yes |
| 56 | Spallone, A. | 2002 | Spallone, A., et al. Experimental studies to achieve H/Pd loading ratio close to 1 in thin wires, using different electrolytic solutions. in The 9th International Conference on Cold Fusion, Condensed Matter Nuclear Science. 2002. Tsinghua Univ., Beijing, China: Tsinghua Univ. Press. | Yes |
| 27 | Celani, F. | 2003 | Celani, F., et al. Thermal and Isotopic Anomalies when Pd Cathodes are Electrolysed in Electrolytes Containing Th-Hg Salts Dissolved at Micromolar Concentration in C2H5OD/D2O Mixtures. in Tenth International Conference on Cold Fusion. 2003. Cambridge, MA: LENR-CANR.org. | Yes |
| 54 | Mizuno, T. | 2004 | Mizuno, T., et al. Neutron emission from D2 gas in magnetic fields under low temperature. in Eleventh International Conference on Condensed Matter Nuclear Science. 2004. Marseille, France. | Yes |
| 57 | Spallone, A. | 2004 | Spallone, A., et al. An Overview Of Experimental Studies On H/Pd Over-Loading With Thin Pd Wires And Different Electrolytic Solutions. in Eleventh International Conference on Condensed Matter Nuclear Science. 2004. Marseille, France. | Yes |
| 28 | Celani, F. | 2005 | Celani, F., et al. New Procedures to Make Active, Fractal-like Surfaces on Thin Pd Wires. in The 12th International Conference on Condensed Matter Nuclear Science. 2005. Yokohama, Japan. | |
| 29 | Celani, F. | 2005 | Celani, F., et al. The Effect of -Phase on H(D)/Pd Overloading. in The 12th International Conference on Condensed Matter Nuclear Science. 2005. Yokohama, Japan. | |

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| 58 | Spallone, A. | 2005 | Spallone, A., et al. Measurements of the Temperature Coefficient Of Electric Resistivity Of Hydrogen Overloaded Pd. in The 12th International Conference on Condensed Matter Nuclear Science. 2005. Yokohama, Japan. | Yes |
| 63 | Takahashi, A. | 2005 | Takahashi, A., F. Celani, and Y. Iwamura. The Italy-Japan Project -- Fundamental Research on Cold Transmutation Process for Treatment of Nuclear Wastes. in The 12th International Conference on Condensed Matter Nuclear Science. 2005. Yokohama, Japan. | |
| 64 | ~~Takahashi, A.~~ | ~~2005~~ | ~~Takahashi, A., F. Celani, and Y. Iwamura. The Italy-Japan Project -- Fundamental Research on Cold Transmutation Process for Treatment of Nuclear Wastes (PowerPoint slides). in The 12th International Conference on Condensed Matter Nuclear Science. 2005. Yokohama, Japan.~~ (Duplicate) | |
| 30 | Celani, F. | 2006 | Celani, F. Toward the use of nanoparticles for stable excess heat in Pd-D system: progress report at INFN-LNF. in 7th International Workshop on Anomalies in Hydrogen / Deuterium loaded Metals. 2006. Asti, Italy: iscmns.org. | Yes |
| 52 | Marmigi, A. | 2007 | Marmigi, A., et al. Anomalous heat Generation by surface oxidized Pd wires in a hydrogen atmosphere. in Proceedings of the 8th International Workshop on Anomalies in Hydrogen / Deuterium Loaded Metals. 2007. Sicily, Italy. | Yes |
| 59 | Spallone, A. | 2007 | Spallone, A., et al. A Review of Experimental studies about Hydrogen over-loading within Palladium wires (H/Pd > 1). in Proceedings of the 8th International Workshop on Anomalies in Hydrogen / Deuterium Loaded Metals. 2007. Sicily, Italy. | Yes |
| 31 | Celani, F. | 2008 | Celani, F., et al. Deuteron Electromigration in Thin Pd Wires Coated With Nano-Particles: Evidence for Ultra-Fast Deuterium Loading and Anomalous, Large Thermal Effects. in ICCF-14 International Conference on Condensed Matter Nuclear Science. 2008. Washington, DC. | Yes |
| 32 | Celani, F. | 2009 | Celani, F., et al. Towards a high temperature CMNS reactor: nano-coated Pd wires with D2 at high pressures (PowerPoint slides). in 15th International Conference on Condensed Matter Nuclear Science. 2009. Rome, Italy: ENEA. | Yes |
| 33 | ~~Celani, F.~~ | ~~2009~~ | ~~Celani, F., et al. Towards a High Temperature CMNS Reactor: Nano-Coated Pd Wires with D2 at High Pressures. in 15th International Conference on Condensed Matter Nuclear Science. 2009. Rome, Italy: ENEA.~~ (Duplicate) | Yes |
| 34 | Celani, F. | 2011 | Celani, F., et al. Sviluppo di catalizzatore ternario, skeleton type, per studi su anomalie termiche nei sistemi Metallo-Idrogeno ad alta temperatura (PowerPoint slides). in Coherence 2011. 2011. Ministero dell'Aereonautica, Italy. | Yes |
| 35 | Celani, F. | 2012 | Celani, F., et al. Experimental results on sub-micro structured Cu-Ni alloys under high temperatures Hydrogen/Deuterium interactions (PowerPoint slides). in X International Workshop on Anomalies in Hydrogen Loaded Metals. 2012. Siena, Italy. | Yes |
| 36 | Celani, F. | 2012 | Celani, F., et al., Development of a High Temperature Hybrid CMNS Reactor. J. Condensed Matter Nucl. Sci., 2012. 6: p. 24-33. | Yes |
| 37 | Celani, F. | 2013 | Celani, F., et al. Further progress/developments, on surface/bulk treated Constantan wires, for anomalous heat generation by H2/D2 interaction. in ICCF18 Conference. 2013. University of Missouri. | Yes |
| 38 | Celani, F. | 2013 | Celani, F., et al., Experimental Results on Sub-Micro structured Cu-Ni Alloys under High Temperature Hydrogen/Deuterium Interaction. Chemistry and Materials Research, 2013. 3(3). | Yes |

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| 39 | Celani, F. | 2013 | Celani, F., et al., Improved understanding of self-sustained, sub-micrometric multicomposition surface Constantan wires interacting with H2 at high temperatures: experimental evidence of Anomalous Heat Effects. Chemistry and Materials Research, 2013. 3(12). | Yes |
| 40 | Celani, F. | 2014 | Celani, F., et al., Cu-Ni-Mn alloy wires, with improved submicrometric surfaces, used as LENR device by new transparent, dissipation-type, calorimeter. J. Condensed Matter Nucl. Sci., 2014. 13: p. 56-67. | Yes |
| 41 | Celani, F. | 2014 | Celani, F., et al. Cu-Ni-Mn alloy wires, with improved submicrometric surfaces, used as LENR device by new transparent, dissipation-type, calorimeter (PowerPoint slides). in ICCF18 Conference. 2014. University of Missouri. | Yes |
| 53 | Mastromatteo, U. | 2015 | Mastromatteo, U., A. Bertele, and F. Celani, Hydrogen Absorption and Excess Heat in a Constantan Wire with Nanostructured Surface. J. Condensed Matter Nucl. Sci., 2015. 15. | Yes |
| 42 | Celani, F. | 2016 | Celani, F., et al., Observation of Macroscopic Current and Thermal Anomalies, at High Temperature, by Hetero-structures in Thin and Long Constantan Wires Under H2 Gas. J. Condensed Matter Nucl. Sci., 2016. 19. | Yes |
| 43 | Celani, F. | 2017 | Celani, F., A.O. Di Tommaso, and G. Vassallo, The Zitterbewegung Interpretation of Quantum Mechanics as Theoretical Framework for Ultra-dense Deuterium and Low Energy Nuclear Reactions. J. Condensed Matter Nucl. Sci., 2017. 24: p. 32-41. | Yes |
| 44 | Celani, F. | 2017 | Celani, F., A. Tommaso, and G. Vassallo, The Electron and Occam's Razor. J. Condensed Matter Nucl. Sci., 2017. 25: p. 76-99. | Yes |
| 45 | Celani, F. | 2017 | Celani, F., A. Tommaso, and G. Vassallo, Maxwell's Equations and Occam's Razor. J. Condensed Matter Nucl. Sci., 2017. 25: p. 100-128. | Yes |
| 46 | Celani, F. | 2018 | Celani, F., et al., Improved Stability and Performance of Surface-Modified Constantan Wires, by Chemical Additions and Unconventional Geometrical Structures. J. Condensed Matter Nucl. Sci., 2018. 27: p. 9-21. | Yes |
| 47 | Celani, F. | 2019 | Celani, F., et al. Effects of "super-Capuchin knot" geometry, and additional electric fields, on Hydrogen/Deuterium absorption: related AHE on long and thin Constantan wires with sub-micrometric surfaces at high temperatures. in 2019 LANR/CF Colloquium at MIT. 2019. Cambridge, MA. | Yes |
| 48 | Celani, F. | 2019 | Celani, F., et al., Steps to Identify Main Parameters for AHE Generation in Sub-micrometric Materials: Measurements by Isoperibolic and Air-flow Calorimetry. J. Condensed Matter Nucl. Sci., 2019. 29: p. 52-74. | Yes |
| 49 | Celani, F. | 2020 | Celani, F., et al., First Evaluation of Coated Constantan Wires Incorporating Capuchin Knots to Increase Anomalous Heat and Reduce Input Power at High Temperatures. J. Condensed Matter Nucl. Sci., 2020. 30: p. 25-35. | Yes |
| 50 | Celani, F. | 2020 | Celani, F., et al., Progress Toward an Understanding of LENR-AHE Effects in Coated Constantan Wires in D2 Atmosphere: DC/AC Voltage Stimulation. J. Condensed Matter Nucl. Sci., 2020. 33: p. 46-73. | Yes |
| | Celani, F. | 2021 | Celani, F., et al. Development of Simpler Procedures to Activate Surface- Coded Constantan Wires and to Induce AHE: the Hunt for Potential Mistakes. Sovrabbondare nella Speranza: To Overflow in Hope, ANVA8HOPE, December 17-19, 2021. | |
| | Celani, F. | 2022 | Celani, F., et al. Further Results Using SIMPLE Procedures to Activate Surface-Modified Constantan Wires for AHE Production. in 15th International Workshop on Anomalies in Hydrogen Loaded Metals and CleanHME (IWAHLM15). 2022. Assisi, Italy. | Yes |
| | Celani, F. | 2022 | Celani, F., et al. Energy from Hydrogen: What Stage are We at? Hydrogen and Its Isotopes for Energy Production with Non- | |

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| | | | Conventional Methodologies: Recent International Events. Fondazione #Italia Protagonista", Roma, 25 Maggio 2022 (#Italy Protagonist Foundation", Rome, May 25, 2022). | |
| | Celani, F. | 2022 | Celani, F., et al., Electromagnetic Excitation of Coaxially-Coiled Constantan Wires by High-Power, High-Voltage, Microsecond Pulses. J. Condensed Matter Nucl. Sci., 2022. 36: p. 408-435. | Yes |
| | Celani, F. | 2022 | Progresses on Confirming Simple Procedures to Produce AHE and Investigate Their Origin by Thin Constantine Wires under H2, D2 Gases at High Temperatures. ICCF-24, Mountain View, CA, July 25-28, 2022. | |
| | Celani, F. | 2022 | Celani , F., and A. Spallone. Electromagnetic Excitation of Coaxiall-Coiled Constantan Wires by High-Power, High-Voltage, Microsecond, Pulses. J. Condensed Matter Nucl. Sci., 2022. 36. p. 409-435. | |
| | Celani, F. | 2022 | Celani, F., et al. Further Results Using SIMPLE Procedures to Activate Surface and Modified Constant Hand Wires for AHE Production. IWAHLM 15, September 26-28, 2022. | |
| | Celani, F. | 2023 | Celani, F., et al. An Update on the Electric Pulses as an Approach to Induce LENR-AHE in Hydrogen-Loaded Materials. in ANV12. 2023. Terni, Italy. | Yes |

# 3 Laboratory

Dr. Celani's LENR laboratory is located on the campus of INFN in Frascati. It is shown in Figures 3-1 and 3-2, which is a view of Dr. Celani closing the lab door. Pietro Cerreone, Dr. Celani, and Dr. Grimshaw are shown in fornt of the lab in Figure 3-3. Interior views on the left and right sides of the lab, taken from near the entrance, are in Figures 3-4 and 3-5.

Heavy water is used in some of Dr. Celani's LENR experiments. A supply of heavy water is kept in a small room on the exterior of the lab building (Figure 3-6). The entrance to INFN is shown in Figure 3-7.

*Figure 3-1*

*Exterior Photo of Dr. Celani's LENR Laboratory*
*(Note: The lab is on the building on the right.)*


*Figure 3-2*

*Exterior View of the LENR Lab with Dr. Celani Closing the Door*
*(Note: The INFN particle accelerator appears to the right of the lab.)*

*Figure 3-3*

*Pietro Cerreone, Dr. Celani and Tom Grimshaw at the Entrance to the LENR Lab*

*Figure 3-4*

*Interior View of Laboratory (Left Side)*

*Figure 3-5*

*Interior View of Laboratory (Right Side)*

*Figure 3-6*

*Heavy Water Jug in Storage Room Located Outside of the Lab*


*Figure 3-7*

*Entrance Gate for INFN, Frascati, Italy*

# 4 Experiment Initiation during the Site Visit

During the site visit for the CLRDP on September 23, 2022, Dr. Celani and his assistant, Pietro Cerreoni, assembled and initiated a LENR experiment. Dr. Celani is shown holding the experiment cell with Pietro behind him in Figure 4-1.

The experimental approach is well described in a recent paper[4] in the Journal of Condensed Matter Nuclear Science (JCMNS). The cell includes a LENR reactor with a coaxial cathode-anode wire geometry. The cathode is a helix of Constantan wire with 58 turns. The anode is a hollow iron tube inside the coil but is separated by a sheath. Dr. Celani is holding the reactor from inside the cell in Figure 4-2. A reactor diagram from the recent paper is in Figure 4-3.


*Figure 4-1*

*Dr. Celani Holding the Experiment Cell, with Pietro Cerreoni behind Him*

[4] Celani, F., et al., 2022. Electromagnetic Excitation of Coaxially-Coiled Constantan wires by High-Power, High-Voltage, Microsecond Pulses. Journal of Condensed Matter Nuclear Science, Vol 36, p. 408-435, November.

*Figure 4-2*

*Dr. Celani Holding the Inner Reactor Component of the Cell*

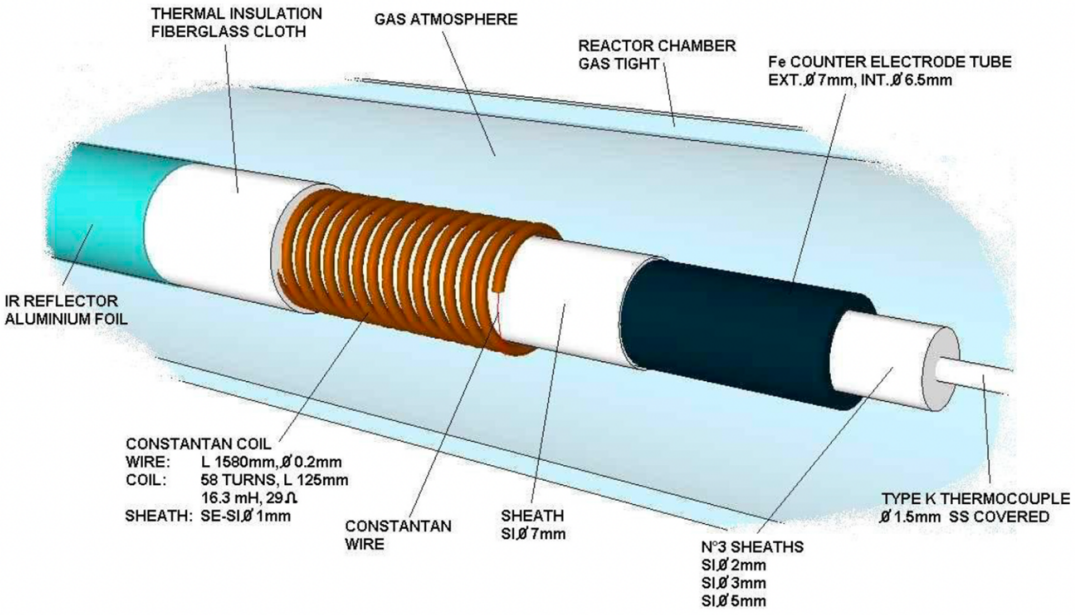



*Figure 4-3*

*Diagram of Cell from the JCMNS Paper*

# 5 Photos and Images in the Lab

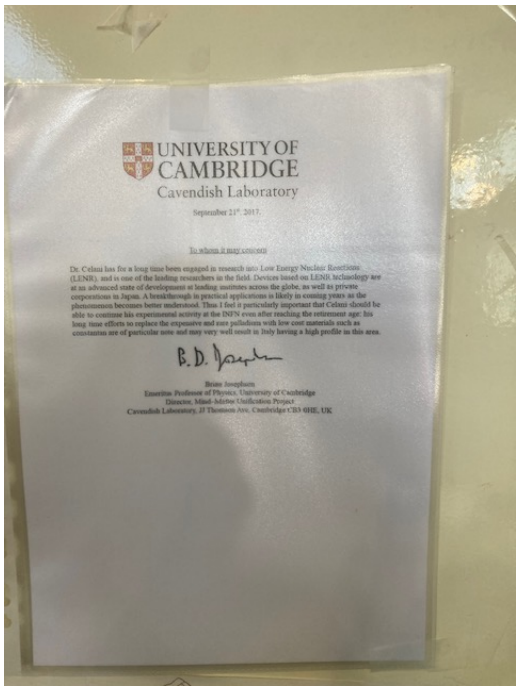
Dr Celani has many photos, letters and other items on the walls and cabinet doors in his lab. Several of them were photographed during the site visit. Examples are in Figures 5-1 to 5-6.

*Figure 5-1*

*Dr. Celani with His Truffle Prize that He Received in 1997 at a LENR Conference in Asti, Italy*

*Figure 5-2*

*Dr. Celani with Yoshiaki Arata, Francesco Banno, and Talbot Chubb at ICCF-14, Washington, DC in 2008*



UNIVERSITY OF CAMBRIDGE
Cavendish Laboratory

September 21st, 2017.

To whom it may concern

Dr. Celani has for a long time been engaged in research into Low Energy Nuclear Reactions (LENR), and is one of the leading researchers in the field. Devices based on LENR technology are at an advanced state of development at leading institutes across the globe, as well as private corporations in Japan. A breakthrough in practical applications is likely in coming years as the phenomenon becomes better understood. Thus I feel it particularly important that Celani should be able to continue his experimental activity at the INFN even after reaching the retirement age: his long -time efforts to replace the expensive and rare palladium with low cost materials such as constantan are of particular note and may very well result in Italy having a high profile in this area.

B. D. Josephson

Brian Josephson
Emeritus Professor of Physics, University of Cambridge
Director, Mind -Inferior Unification Project
Cavendish Laboratory, JJ Thomson Ave. Cambridge CB3 0HE, UK

*Figure 5-3*

*Letter from Nobel Laureate Brian Josephson in Support of Dr. Celani's Retaining His Lab at INFN After Retirement*

AMERICAN CHEMICAL SOCIETY

This is to certify that

Dr. Francesco Celani

is a member of the American Chemical Society, entitled to all rights and privileges associated therewith as specified in the Constitution, By-Laws, and Regulations of the Society.

Marinda Li Wu, Ph.D.
President

Madeleine Jacobs
Executive Director

*Figure 5-4*

*Certificate of Dr. Celani's Membership in the American Chemical Society*


*Figure 5-5*

*Photo of Nobel Laureate Irving Langmuir, Author of "Pathological Science" (December 1953) (Note: Some of Langmuir's experimental work on hydrogen dissociation has inspired Celani's work since 2012.)*

*Figure 5-6*

*Dr. Celani with His Spouse, Misa Nakamura, and Their Two Daughters Photo Taken at ICCF-22, Assisi, Italy, September 2018.*

# 6 Electronic Files

During the second site visit in June 2023, Pietro Cerreone, under Dr. Celani's guidance, prepared a set of electronic files to include with the CLRDP. A screenshot of the partially expanded folders and files is shown in Figure 6-1. A total of 6947 files are included. More detailed documentation of the electronic files and their origins (EG experimental descriptions, photos, or data files) may be performed in the future.

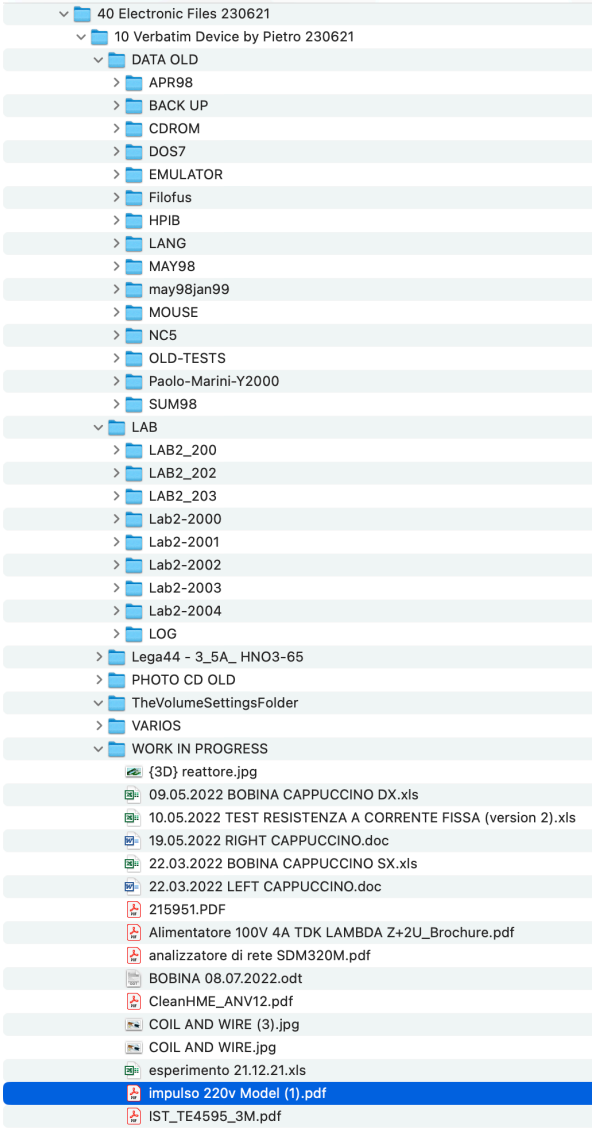



*Figure 6-1a.*

*Screenshot of Dr. Celani's Electronic Folders and File (Partially Expanded)*

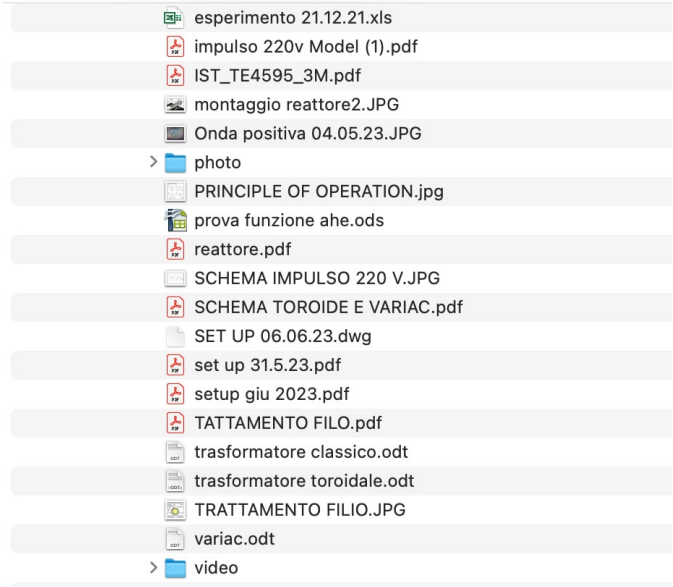



*Figure 6-1b.*

*Screenshot of Dr. Celani's Electronic Folders and File (Continued)*

# 7 Hardcopy Files

The hardcopy files in Dr. Celani's lab were surveyed during the second site visit. They are located within and on top of metal cabinets located at the rear of the LENR lab (Figure 7- 1). They include many other items besides hardcopy files. The survey, which was conducted in two parts for the two locations, started with a sketch diagram, (Figure 7-2). The items in the cabinets were described by shelf, and the containers above were numbered from 1 to 35 from left to right.

Although the locations of the hardcopy files have been documented, the opportunity still exists for scanning them to PDF or similar format for addition to the CLRDP in the future.

*Figure 7-1*

*View of LENR Lab Showing Metal Cabinets in the Rear and the Boxes Stacked on Top (Note: Dr. Celani and Pietro Cerreone are also shown in the photo.)*

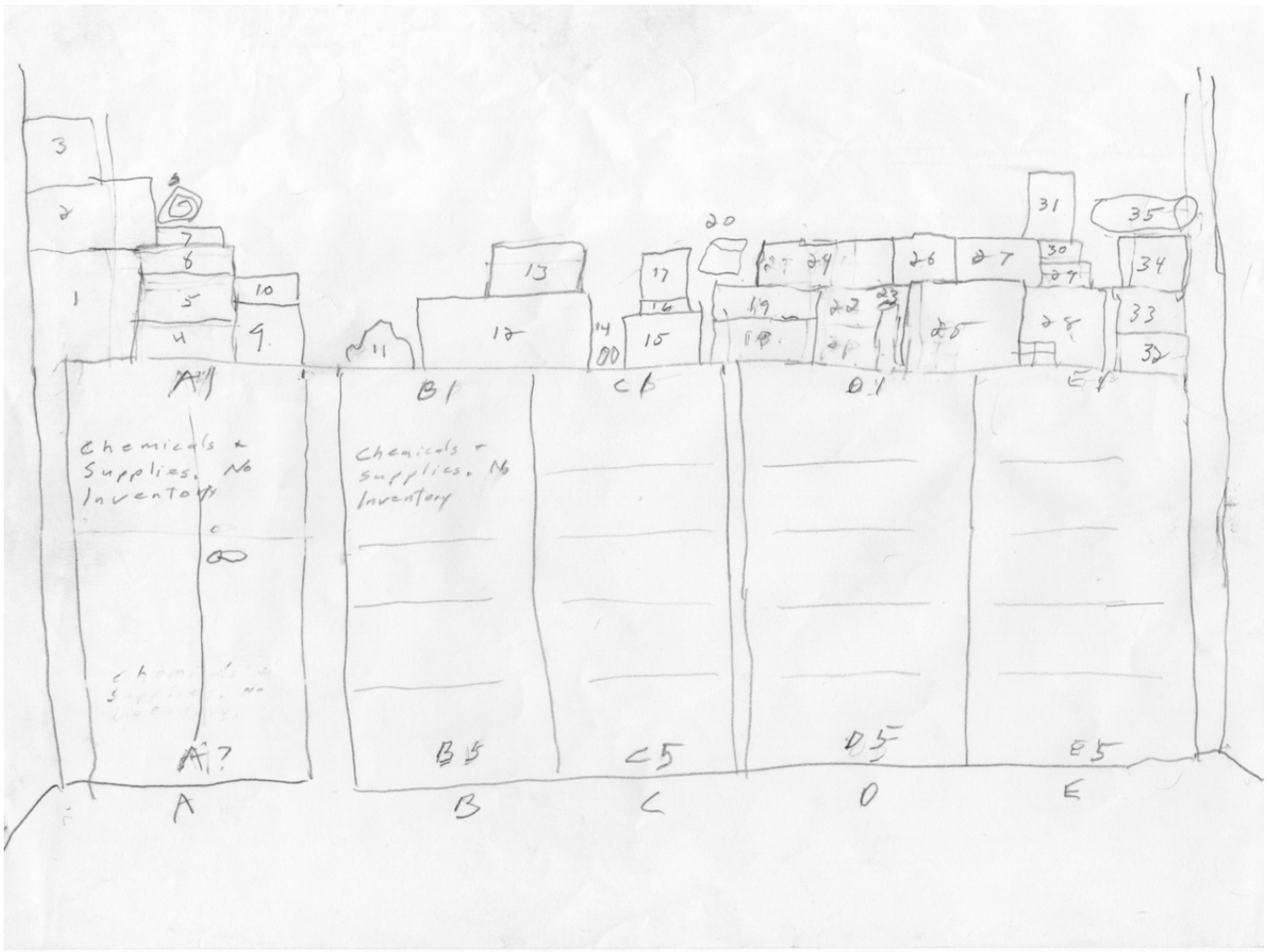



*Figure 7-2*

*Diagram Showing Cabinets A to E and Containers 1 to 35 on Top of the Cabinets*

## *7.1 Items Inside the Cabinets*

The five cabinets, designated A to E, were surveyed shelf by shelf (5 shelves each). A description of the contents is presented in Table 7-1. The cabinets are shown in Figure 7-3 Cabinets A and contain chemicals and other supplies and were not reviewed.

*Table 7-1*

*Summary Inventory of Contents of Cabinets [Add lab notebooks & LENR Library in Cabinet C]*

Cabinet A. Chemicals and supplies. Not inventoried.

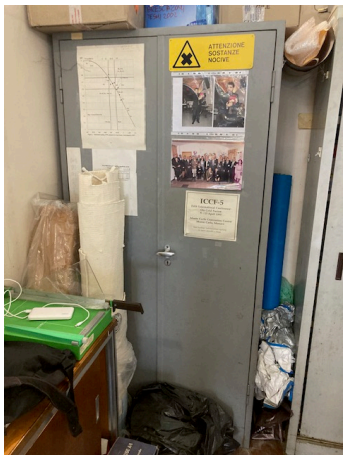
Cabinet B. Chemicals and supplies. Not inventoried.

Cabinet C, Shelves 1–5.
1. LENR Library items.
2. LENR Library Items. Lab notebooks in back. ICCF proceedings in front.
3. 14 blue ring binders, with copies of papers.
   - Equipment instructions.
   - Folders with conference materials.
   - Manila envelopes with articles (probably not cold fusion).
4. Ring binders in boxes. Four plus one empty (DOX). Generally copies of past papers.
   - Group of plastic inserts. Generally copies of emails.
   - Three INFN lab notebooks, one large, two small.
   - HP operating manual for HP 3457a multimeter.
   - Two ring binders.
   - Group of miscellaneous publications and papers, not inventoried.
   - Blue folding box with copies of emails.
5. Stack of papers, etc. of unknown content.
   - Lab supplies.
     - Four vacuum tubes, Professor Basso.
     - Box of syringes.
   - Box of photos
     - Three picture holders.
     - DVD: Mallove - Cold Fusion, Fire from Water.
     - DVD: RAI
     - Box of 35 mm slides.
     - Printer cartridge for Epson.

Cabinet D. Shelves 1-5.
1. Six ring binders and bound volumes with instrument instructions and pamphlets for instruments.
   - Stack of manuals and related materials.
   - Two keyboards.
   - Boxes of software: Mac OSX, RoxioTotal3, Epson printer 1290.
2. Four boxes of report bindings.
   - Box of office supplies: staples, pens, stickies, whiteout, felt tip pens, paper clips, Scotch tape, etc.
   - Oversize thermocouple binding (11 x17).
   - X-ray film.
   - Two boxes of DVDs.
   - Card stock, A4.
3. Supplies: paper, transparencies.
   - Oversize paper (11 x 17).
   - Two empty blue INFN notebooks.
   - Box of DVDs.
4. Stack of miscellaneous papers, not inventoried.
   - Nine blue three-ring binders. Contain data sheets in plastic inserts.
   - Nine blue three ring binders with transparencies in inserts.
   - Three unused quadrille bound lab notebooks.
   - Batch of data sheets and plastic sheet page, 2004, approximately 12.
5. Box of printer cartridges.
   - Two empty blue four-ring binders.
   - One large ring binder with box (DOX) containing papers and instructions apparently for ceramics.
   - Empty plastic candy box.

Cabinet E, Shelves 1-5.
1. Brother label maker, in box.
   - Horizontal stock: paper, pamphlets, ring binder, not inventoried.
   - Transparency boxes, not inventoried.
   - Vertical stack of papers, not inventoried.
   - Blue three-ring binder, contains experimental data in sleeves.
   - Two ring binders in boxes (DOX), minor contents, not inventoried.
2. Supplies and miscellaneous.
   - KaleidaGraph software box.
   - Empty four ring binder.
   - Oversize thermoelectric paper.
   - Partial box of 3.5-inch unused floppies.
   - Two-hole punch.
   - Transparencies.
   - Numerous other items not inventoried.

3. Stacked A4letter holder.
    - Transparencies.
    - Cardboard three-ring binder.
    - Padded envelopes.
    - INFN envelopes.
  - Blue ring binder, “PRIVATO, EC“.
  - Variety of physical materials in plastic inserts.
  - Empty blue ring binder with inserts.
  - Stack of A4 paper.
  - Second A4 letter stacker.
    - User manual?
    - Six boxes of transparencies.
    - A4 paper.
4. Supplies.
  - A4 stacking with plastic sheets.
  - Empty blue INFN bound lab notebooks.
  - Ring binder with Swagelock supplies.
  - Ring binder with Rotorex supplies.
  - Empty blue four-ring binder.
  - Large padded envelopes.
  - Transparencies (three boxes).
  - Plastic sheets.
  - Sixteen boxes of transparencies.
5. Laser distance meter.
  - Large experiment cell.
  - Stack of papers, not inventoried.
  - Two boxes of electrical connectors.
  - Four mostly empty bound notebooks, three for INFN.
  - Stack of papers in inserts. Not inventoried.
  - Empty thin cardboard binder.
  - Blue 4-ring binder. Filled with experiment information in insert sheets. Not inventoried.
  - Loose sheets in inserts. Not inventoried.




*Cabinet A. Chemicals and Supplies*

*Cabinet B. Chemicals and Supplies*

*Cabinet C. LENR Library, Lab Notebooks, etc.*

*Cabinet D. Office Supplies and Printed Material*

*Cabinet E. Primarily Office Supplies*

*Figure 7-3*

*Metal Cabinets Containing Hardcopy Files and Other Items*

## 7.2 Items on Top of the Cabinets

A preliminary inventory of the items found on top of the cabinets appears in Table 7-2. Photos of the items are shown from left to right in Figure 7-4.

*Table 7-2*

*Summary Inventory of Containers above the Cabinets*

1. Government experiments, 2018–2022.
2. Element for printers, Samsung printers.
3. Samsung printer.
4. Documents of presentations. TESMI 2002. Breccia 2004.
5. Government publications. ICCE-2019. AHE-2014-2015. Publications documents, PARMA 2003 (JCF 5).
6. Government publications. ER 2012–2014.
7. Empty container for ammeter.
8. Bubble wrap.
9. Documents and notes. 2002–2004. 2006. Flow discovery. 1980-1990.
10. Presentation documents. 2005.
11. Instruments for experiments (5).
12. Reactor and container. Constructed by Prieto. 2018–2020. Initial work.
13. Syringes.
14. Polyethylene bottles, for chemical components.
15. Cans for lubricant and cleaning.
16. As above. Butane gas.
17. Silicon lubricant.
18. Documents from desk drawer. Personal Celani, 2004, 2005, 2006.
19. Documents found in desk drawer, 2004–2006.
20. Electric components in sack.
21. Contents from desk drawer, 2007, 2008, 2009.
22. Also from desk drawer, 2003–2005.
23. Can of foam; insulation material.
24. Thermal reflector.
25. Documents and notes for experiments, 2001, 2004. Computer for table, Mac iBook.
26. Documents and notes from 1990.
27. Contents of desk drawer. CDs, tapes, photographs. 1992.
28. (Not documented).
29. Accessories for peristaltic pump.
30. 16 CDs with data, copied on thumb drive. 1997, 1998, 1999.
31. Experimental approaches. Unknown. No date. Gamma Ray Experiments.
32. Documents and notes from desk drawer, 2003–2007.
33. Documents and notes. 2002, 2003, 2004, 2005, 2006, 2007, 2008 (2003–2008).
34. Documents and notes, 2010–2016.
35. Collection of 9 ICCF and other bags: 2004, Russia; National Instruments data acquisition; ICCF-19; ICCF-11, France; APS, 1989; etc.

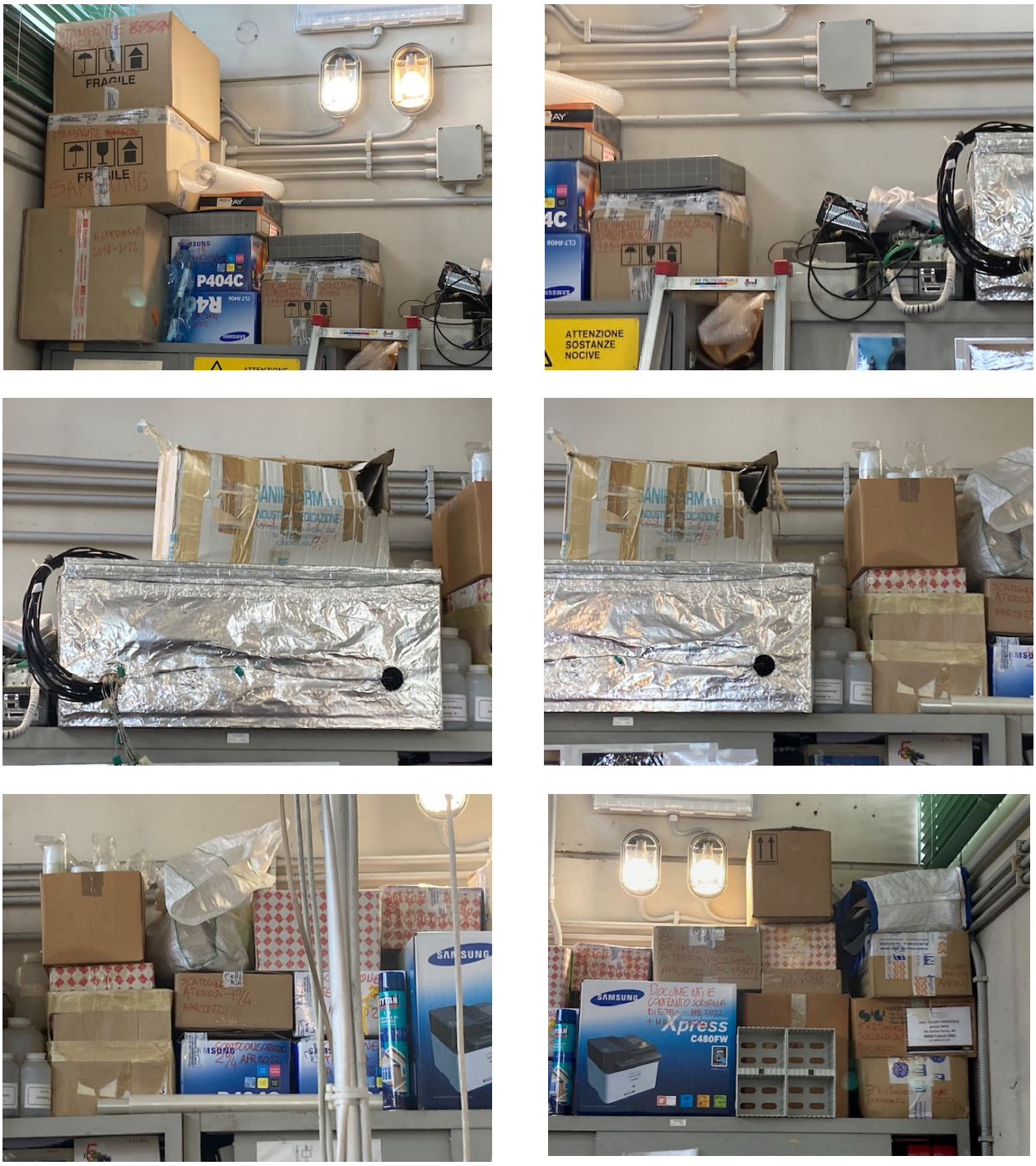



*Figure 7-4*

*Photos (from Left to Right) of Containers and Other Items on Top of the Cabinets*
*(Note: The numbers of the items are shown in the diagram in Figure 7-2)*

# 8 Lab Notebooks

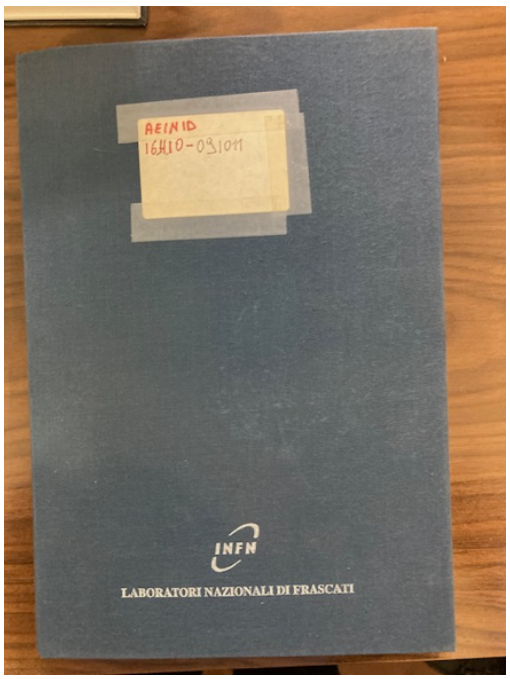
Dr. Celani maintains careful records of his LENR experiments (Figure 8-1). His collection of notebooks from previous experiments is on Shelf 2 of Cabinet C and is shown in Figure 8-2. He has indicated that the collection contains the records of his most recent LENR work and that the documentation of earlier experiments was inadvertently lost in 2015, before his retirement from INFN in 2017. An example lab notebook showing its cover, a data entry page, and two kinds of data plots are shown in Figure 8-3.

*Figure 8-1*

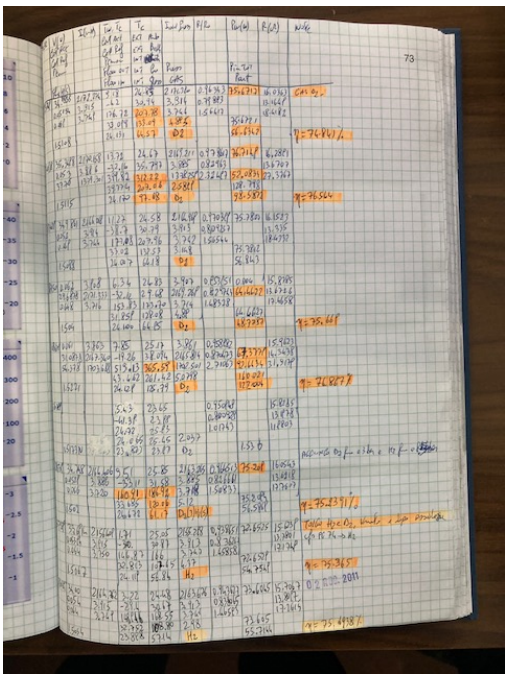
*Dr. Celani Entering Data into a Current Lab Notebook*

*Figure 8-2*

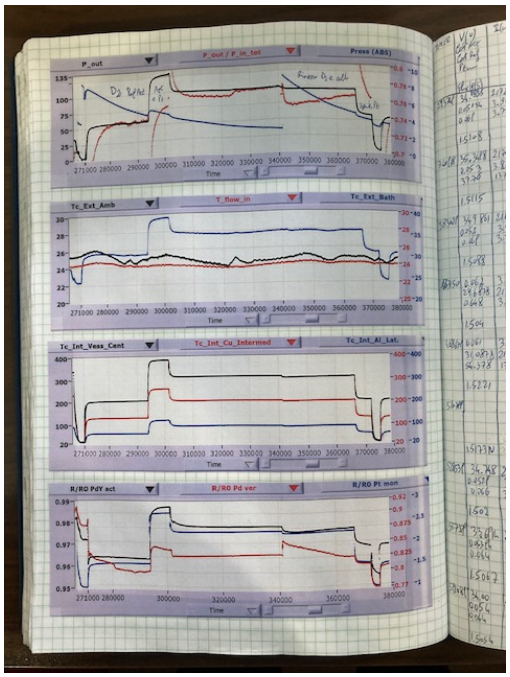
*Bookshelf of Dr. Celani's Collection of Lab Notebooks (Cabinet C, Shelf 2)*



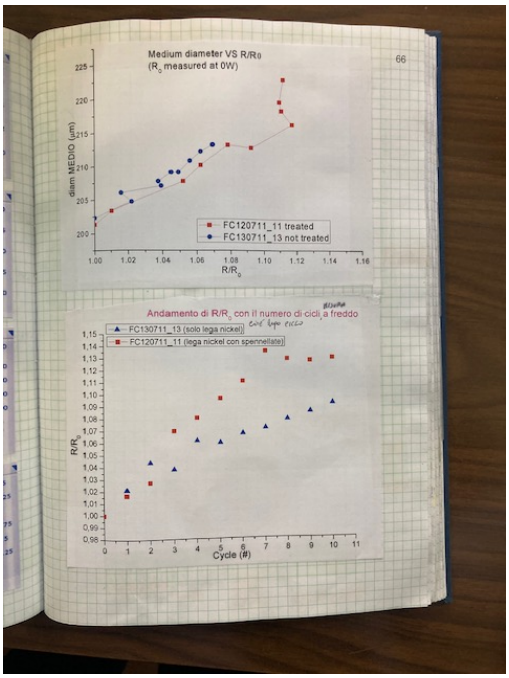

*a. Notebook Cover*



*b. Data Entry Page*




*c. Graphical Representation of Data*




*d. Graphical Representation of Data*

*Figure 8-3*

*Example Lab Notebook*

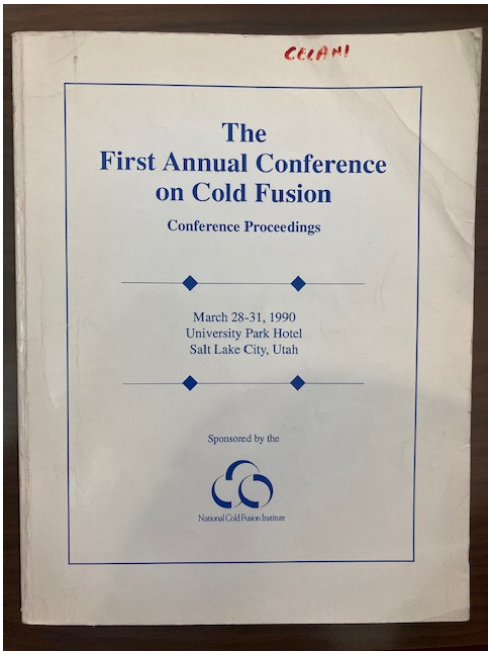
# 9 LENR Library

Dr. Celani's library of LENR books is also in Cabinet C in the rear of his lab (Figure 9-1). An inventory of the LENR books was made during the first site visit and by two emails afterward. They include all but one of the proceedings volumes for the ICCFs produced until the JCMNS starting publishing them for ICCF-17 (Table 9-1).

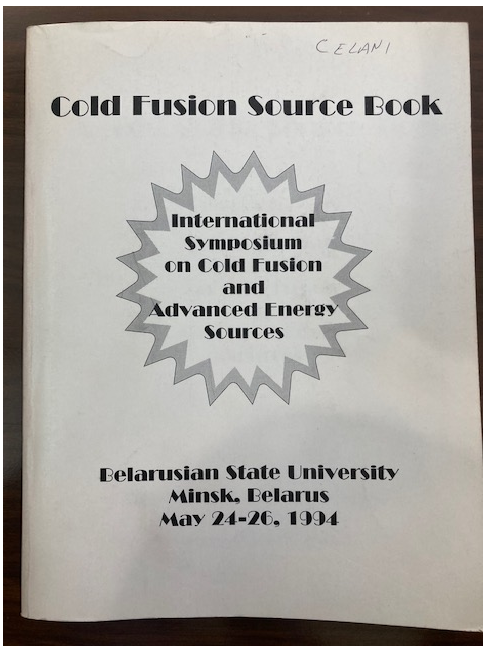
Fifteen additional books have also been identified and are listed in Table 9-2. Figure 9-2 shows two examples of items in Dr. Celani's library – proceedings of the first ICCF and another early international symposium.

*Figure 9-1*

*Bookshelves Holding Dr. Celani's LENR Library (Cabinet C, Shelves 1 and 2)*




*a. Proceedings of the First ICCF Meeting in Salt Lake City in 1990*




*b. 1994 Symposium in Belarus*

*Figure 9-2*

*Example Early Conference Items in Dr. Celani's LENR Library*

*Table 9-1*

*List of ICCF Proceedings in Dr. Celani's LENR Library*

1st International Conference on Cold Fusion (ICCF-1), March 28–31, 1990. Salt Lake City Utah.

2nd International Conference on Cold Fusion (ICCF-2), June 29 to July 4, 1991, Como, Italy

3rd International Conference on Cold Fusion (ICCF-3), October 21-25, 1992, Nagoya, Japan, "Frontiers of Cold Fusion".

4th International Conference on Cold Fusion (ICCF-4), December 6–9, 1993, Lahaina, Maui, Hawaii. Transactions of Fusion Technology.

5th International Conference on Cold Fusion (ICCF-5), April 9–13, 1995, Monte Carlo, Monaco.

6th International Conference on Cold Fusion (ICCF-6), October 13–18, 1996, Japan. "Progress in New Hydrogen Energy".

7th International Conference on Cold Fusion (ICCF-7), *Missing*

8th International Conference on Cold Fusion (ICCF-8), May 20 1–26, 2000, Lerici (La Spezia), Italy

9th International Conference on Cold Fusion (ICCF-9), May 19–24, 2002, Beijing, China. "Condensed Matter Nuclear Science". Xing Z Li.

10th International Conference on Cold Fusion (ICCF-10), August 24-29, 2003, Cambridge, MA. "Condensed Matter Nuclear Science".

11th International Conference on Cold Fusion (ICCF-11), October 31 to November 5, 2004, Marseille, France. "Condensed Matter Nuclear Science".

12th International Conference on Cold Fusion (ICCF-12), November 22 to December 2, 2005, Yokohama, Japan. "Condensed Matter Nuclear Science".

13th International Conference on Condensed Matter Nuclear Science (ICCF-13), June 25 to July 1, 2007, Sochi, Russia.

14th International Conference on Cold Fusion (ICCF-14), August 10–18, 2008, Washington DC.

15th International Conference on Condensed Matter Nuclear Science (ICCF-15), October 5–9, 2009, Rome, Italy.

16th International Conference on Condensed Matter Nuclear Science (ICCF- 6), February 6–11, 2011, Chennai, India.

*Table 9-2*

*List of Additional Items in Dr. Celani's LENR Library*

International Symposium on Cold Fusion and Advanced Energy Sources, Cold Fusion Source Book, May 24–26, 1994, Minsk, Belarus.

Toward the Establishment of Solid Fusion as a Perpetual Energy for Humankind by Yoshiaki Arata, 2008. (Note: This book was translated from Japanese to English by Misa Nakamura, who is Dr. Celani's wife.)

Dalquark Ai Cristalli by Giuliano Preparata, 1999.

Models of the Atomic Nucleus by Norman D. Cooke.

Cold Fusion: The History of Research in Italy, by Sergio Martelucci, et al

Nuclear Transmutation, by Tadahiko Mizuno

Cold Fusion, by Jean-Paul Biberian

Fire from Ice, by Eugene Mallove

The Rebirth of Cold Fusion, by Steven Krivit and Nadine Winocur

Nuclear Transmutation, by Tadahiko Mizuno

Discovery of the Cold Fusion Phenomenon, by Hideo Kozima

Unified Field Theory and Occam's Razor, by Andras Kovacs and Others

Acoustic, Electromagnetic, Neutron Emissions from Fracture and Earthquakes by Alberto Carpenteri and Others

Maxwell-Dirac Theory and Occam's Razor: Unified Field, Elementary Particles, and Nuclear Interactions by Andras Kovacs, and Others

Earth Science and Deuterium Nuclear Reactions: The Origins of Heat, Elements, and Water by Michio Fukuhara

Anomalous Nuclear Effects in Deuterium/Solid Systems, AIP Conference Proceedings 228 by Stephen Jones, Franco Scaramuzzi and David Worledge

# 10 Website

Francesco Celani's website has been documented for the CLRDP. It has a title that is the same as its URL: francescocelanienergy.org. The top of the website is shown in Figure 10-1.


*Figure 10-1*

*Heading of Dr. Celani's Website Homepage*

The primary contents of the website are descriptions of seven of Dr. Celani's most recent presentations and papers as shown in in Table 10-1. Each of the seven items includes a link to the full presentation or paper. An example of an image on the website – for Dr. Celani's presentation at ICCF-24 – is shown in Figure 10-2.

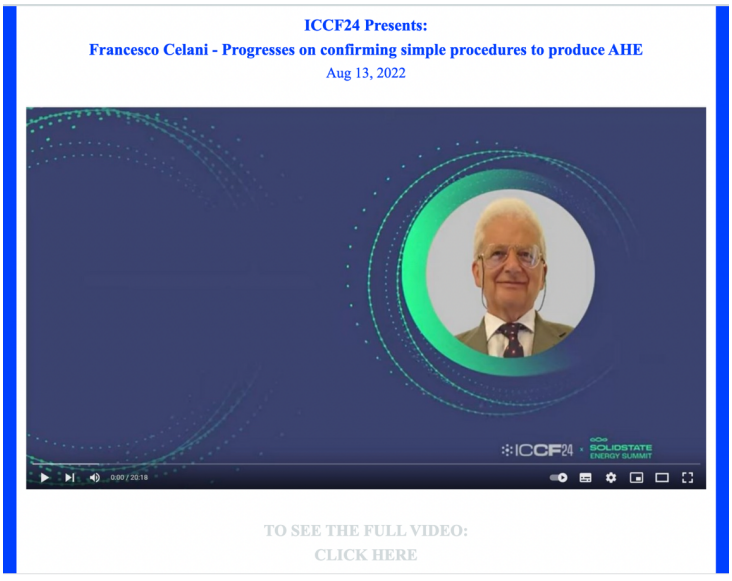



*Figure 10-2*

*Image from Dr. Celani's Presentation at ICCF-24, July 2022, Mountain View, CA*

*Table 10-1*

*Contents of Dr. Celani's Website*

Updating on Further Progresses of Simplified Procedures to Produce Electrical Pulses Able to Induce LENR-AHE Phenomenon in Specific, Hydrogen-Loaded, Materials. Workshop multidisciplinare. ANV Number 12, Terni, Italy, 17 to 19 February 2023

Experiments with Constantan and Gases: New Measurements of Thermal Anomalies Changing Gas Type and Electric Wave Forms. Workshop multidisciplinare "Assisi Nel vento 11" (ANV11), tenutosi (questa volta). December 17-18, 2022.

Further Results Using SIMPLE Procedures to Activate Surface and Modified Constant Hand Wires for AHE Production. IWAHLM 15, September 26-28, 2022

Progresses on Confirming Simple Procedures to Produce AHE and Investigate Their Origin by Thin Constantine Wires under H2, D2 Gases at High Temperatures. ICCF-24, Mountain View, CA, July 25-28, 2022.

Unified Field Theory and Occam's Razor: Simple Solutions to Deep Questions. 2022 Book by Andráš Kovacs, Giorgio Vassallo, Paul, O'Hara, Francesco Celani , Antonio Oscar Di Tommaso.

Energi dall'idrogeno: a che punta siamo? Idrogeno e suoi isotopi per produzione di energia con metodologie non-convenzionali: recent event internazional. Energy from Hydrogen: What Stage are We at? Hydrogen and Its Isotopes for Energy Production with Non-Conventional Methodologies: Recent International Events. Fondazione #Italia Protagonista", Roma, 25 Maggio 2022 (#Italy Protagonist Foundation", Rome, May 25, 2022).

Development of Simpler Procedures to Activate Surface- Coded Constantan Wires and to Induce AHE: the Hunt for Potential Mistakes. Sovrabbondare nella Speranza: To Overflow in Hope, ANVA8HOPE, December 17-19, 2021.

# 11 Interview for Cold Fusion Contributions

A lengthy interview was conducted for the CLRDP with Dr. Celani about his work in the LENR field. It took place during the site visit on September 23, 2022 and consisted of 6 parts. The interview has been transcribed and requires additional review. This review, or an additional interview, may be accomplished in the future. The unedited transcription is in Appendix A.

# 12 Future Opportunities

A principal opportunity identified in the first (January 23, 2023) project report was to document Dr. Celani's electronic and hardcopy files. This was accomplished in the second site visit in June 2023. Whereas the hardcopy files have been partially documented for their location in Dr. Celani's lab in this current report, the opportunity remains to scan them into PDF or similar format for the CLRDP.

It was also noted in the draft report that the interview transcripts required review because of Dr. Celani's Italian accent in English. When this review (and/or another interview) is accomplished, a timeline of his LENR research may be developed.

# 13 Project Methods

The methods used in the CLRDP are based on general LRDI procedure (Figure 13-1) that are modified to meet the specific requirements of individual projects[5]. The CLRDP is being performed according to accepted project management practices[6]. The overall LRDI procedure is set forth in an article in Infinite Energy[7] and on the LENRGY website[8].


*Figure 13-1*

*LRDI Procedure*

[5] Grimshaw, T.W., 2019. Collection, Organization, and Documentation of LENR Research Results: Guideline. January.

[6] Project Management Institute, 2017. A Guide to the Project Management Body of Knowledge (PMBOK® Guide) — Sixth Edition and Agile Practice Guide (ENGLISH). Project Management Institute. Newtown Square, PA.

[7] Grimshaw, T., 2020. Documenting Cold Fusion Research: Preserving a Vital Asset for Humankind. Infinite Energy, Issue 150, March/April 2020, p. 9-13.

[8] LENRGY: Securing the Benefits of Cold Fusion Realization. www.lenrgyllc.com.

The CLRDP began with delineation of Dr. Celani's publications that are included in Rothwell's LENR-CANR.org library website as described in Section 2. Thirteen memos have been prepared to record progress as shown in Table 13-1.

*Table 13-1.*
*Memos Prepared for the Celani LENR Research Documentation Project*

| Date | Subject |
|---|---|
| August 7, 2022 | "Celani" Listings on LENR-CANR.org |
| October 27, 2022 | Selected Photos from Site Visit on September 23, 2022 |
| November 3, 2022 | Transcripts of Interviews on LENR Research |
| November 20, 2022 | LENR Laboratory Notebooks |
| November 30, 2022 | Description of Assembly and Activation of Current Experiment |
| December 14, 2022 | Overview of LENR Laboratory on the INFN Campus |
| December 26, 2022 | Description of the Celani Website: francescocelanienergy.org |
| January 13, 2023 | Documentation of LENR Library (Revision 2) |
| January 22, 2023 | Photos and Images on the Walls of Dr. Celani's Laboratory |
| June 26, 2023 | Summary of Second Site Visit |
| July 12, 2023 | Electronic Files in the Celani LENR Lab |
| July 18, 2023 | Selected Photos from Second Site Visit |
| July 19, 2023 | Hardcopy Files in the Celani LENR Lab |

# Appendix A. Transcript of Interview on September 23, 2022 (Unedited)

## A1. First Segment

| | |
|---|---|
| Francesco Celani: | ... make noise. |
| Thomas Grimshaw: | Okay. This is Tom Grimshaw. I'm here with Francesco Celani. Today is Friday, September 23rd, 2022 and we're here to talk about Francesco's work in the cold fusion area in the years since the announcement on March 23rd, 1989. And I'm going to pause here for just a moment and make sure this recorder is working. |

## A2. Second Segment

| | |
|---|---|
| Thomas Grimshaw: | Okay, this is Tom Grimshaw again. This is the second session after the introductory section of an interview with Francesco Celani. We're here to talk about Dr. Celani's experiments and contributions to the cold fusion field, and Francesco, I suggest we start. Where were you? Well, actually, when did you first hear of the announcement on March 23rd, 1989? How did you hear about it? |
| Francesco Celani: | Yes, it was a very, very funny situation, because it was my first lesson of [foreign language 00:00:41], I don't know English name exactly, because I like to drive flights, more flight, [foreign language 00:00:50] flight, but I know they are very dangerous. So before starting to lesson, I want to learn how to get out from the flight [foreign language 00:01:02] went broke. So it was my first lesson, and in the evening, the teacher that was a [foreign language 00:01:11]- |
| Thomas Grimshaw: | A flight instructor? |
| Francesco Celani: | Yeah, a flight instructor. No, I want to jump from the flight from the plane flight to bring the [foreign language 00:01:23]- |
| Thomas Grimshaw: | Yeah. To- |
| Francesco Celani: | [foreign language 00:01:25], yeah. |
| Thomas Grimshaw: | To parachute from a plane. |
| Francesco Celani: | Yes, yes, yes, before starting lesson. I told "okay". Now we have a guest here, a very strong, very French, new from [foreign language 00:01:38] that to chemistry may be famous. And they claim to have done fusion in a very simple way without using big machine, but a tabletop system. So, |

okay, all is possible, but it seems strange. And then, I know this group student [foreign language 00:02:07], physicist of chemistry, so just make you happy to know about. And I say, "Oh, okay. Could be interesting." Maybe next week they will be absent because they want to demonstrate that such big investor were drunk.

And I sat [foreign language 00:02:28] days later [foreign language 00:02:29]. I have quite enough good experience both in chemistry, physicist, electronics, mechanical. I think I can be able to check where such big professor make mistakes.

Thomas Grimshaw: Okay, so this was-

Francesco Celani: Just young scientist.

Thomas Grimshaw: Yeah, I understand. You were a young guy who was going to show whether they were right-

Francesco Celani: Yeah. Enough, enough young.

Thomas Grimshaw: Yeah.

Francesco Celani: I looked young, but [foreign language 00:03:03].

Thomas Grimshaw: So this... And you did this experiment starting, what? Just a few days after March 23rd?

Francesco Celani: Yeah, I start... I attempt the one, 24 I came to [foreign language 00:03:15] I try to find the proper material, but really start 26 because finding [inaudible 00:03:22], so I need some, two days to assemble.

Thomas Grimshaw: Okay.

Francesco Celani: And I start and I found something very strange because I have gamma and [foreign language 00:03:38] in the vectors. My standard work was particle the vectors expert. And I found that during, not including the condition, something happened that I cannot explain. And this happened after maybe five hours or 10 hours from the beginning of the experiment. And when I changed something like take off power or start again power, something wrong happened, something strange happened. And if I start from zero and I make on, off at the beginning, nothing happened. It means the something correlated with the [inaudible 00:04:28] of heavy water in the palladium. I was able to get some palladium raw from my friends, so friends in the [inaudible 00:04:40] the chemistry so, for me, it was a little bit easy to find all you need to [inaudible 00:04:48] the other side, the only [inaudible 00:04:53] side, and you wait what happened [inaudible 00:04:57].

Thomas Grimshaw: Mm-hmm.

Francesco Celani: So during non-equilibrium after sometimes, at the beginning, several hours, days, when it do something strange, strong, happened something I cannot explain. And then, I make this report at the first conference

cold fusion. It was held in April, maybe 10. Now, I can't remember well in Erice, south of Italy, famous area-

Thomas Grimshaw: Yes, I'm familiar with Erice.

Francesco Celani: Okay, nice, nice place.

Thomas Grimshaw: Yes.

Francesco Celani: And that day the conference was organized professor [foreign language 00:05:41], was the big boss of Erice-

Thomas Grimshaw: Okay.

Francesco Celani: ... quite famous scientist in Italy as I said. And he invited the same time Fleishmann, Ponds, and Jones. They don't speak each other, they fight, but-

Thomas Grimshaw: Stephen Jones on the one hand, and Martin Fleishmann and Ponds on the other hand, yeah.

Francesco Celani: Strong-

Thomas Grimshaw: Strong personalities.

Francesco Celani: Yeah, very strong personalities. Anyway, I was able to agree with both of them, and because I have done three years before in [inaudible 00:06:22] laboratory, qualification of [inaudible 00:06:25] flux, I was brave to ask in public to [inaudible 00:06:31], was the big boss of [inaudible 00:06:33], to use again the laboratory, not for his pupils, for my pupils because I say, "We are looking for [inaudible 00:06:42] in variable level," but then, they place where the [inaudible 00:06:49] flux [inaudible 00:06:49] is very low, can be some possibility to see better them.

And two days later, I have seen in nature that the [inaudible 00:07:02], was a British woman, report my request and say, "Okay, good idea from Celani."

Thomas Grimshaw: Good.

Francesco Celani: My face [inaudible 00:07:12]. But small.

Thomas Grimshaw: Okay, so, let me back up just a moment. When you were running your experiment to confirm the Fleishmann and Ponds experiment, you had an electrolytic cell, and you had radiation detectors. You had particle detectors and radiation detectors?

Francesco Celani: Yeah, but [inaudible 00:07:36] detector. Mainly we have a neutron detector-

Thomas Grimshaw: Neutron.

Francesco Celani: ... which I use it [inaudible 00:07:59] all the [inaudible 00:07:59] later. And some [inaudible 00:07:59], some for gamma. I write for gamma

| | |
|---|---|
| | [inaudible 00:07:59] typical [inaudible 00:07:59]. Because no need of screening, because the mountain has a big, big, big screening. |
| Thomas Grimshaw: | Yeah. |
| Francesco Celani: | So I started spending [inaudible 00:08:10] maybe less than one month after the beginning. |
| Thomas Grimshaw: | Okay. |
| Francesco Celani: | [inaudible 00:08:17] |
| Thomas Grimshaw: | Yeah. Yeah. And so you had detectors for radiation or particles or- |
| Francesco Celani: | Yes. |
| Thomas Grimshaw: | Did you also do calorimetry, and look for-? |
| Francesco Celani: | Sometimes. |
| Thomas Grimshaw: | ... at not possible [inaudible 00:08:32] |
| Francesco Celani: | [inaudible 00:08:32] who just put thermometer outside and something bad that we cannot make- |
| Thomas Grimshaw: | Yeah. |
| Francesco Celani: | ... do nothing because we make tests [inaudible 00:08:43] same, palladium was at the time, very difficult to get. So we had to use two pieces exactly the same, and the composition... a lot of problems. |
| Thomas Grimshaw: | Yeah. |
| Francesco Celani: | Seems easy. And there is energy to dissociate heavy water for light water to be different, so not- |
| Thomas Grimshaw: | Yeah. |
| Francesco Celani: | [inaudible 00:09:04] |
| Thomas Grimshaw: | Yeah. I understand. |
| Francesco Celani: | We start. |
| Thomas Grimshaw: | You start? Okay, so, just to summarize, you did detect neutrons? |
| Francesco Celani: | Some. |
| Thomas Grimshaw: | Some neutrons? |
| Francesco Celani: | Only during the known [inaudible 00:09:17] in good condition. |
| Thomas Grimshaw: | Okay. |
| Francesco Celani: | This is the point. Only during the [inaudible 00:09:22]. The start condition, almost nothing. Even- |
| Thomas Grimshaw: | Dynamic [inaudible 00:09:27]? |
| Francesco Celani: | Dynamically. Even the [inaudible 00:09:29] laboratory, the ground is one times lower than normal [inaudible 00:09:35]. |

Thomas Grimshaw: Okay.

Francesco Celani: [inaudible 00:09:37], so if you have even teeny affect [inaudible 00:09:40]

Thomas Grimshaw: Right.

Francesco Celani: But, statically, the row. Just [inaudible 00:09:46] with the two, three points but escape the ground. Two, three counts.

Thomas Grimshaw: Okay.

Francesco Celani: Eh, one, but during the [inaudible 00:09:56] start to jump to 20, 30, 40. Big difference.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: I was convinced that [inaudible 00:10:05] to see the [inaudible 00:10:07] affect.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: I gave it two to demonstrate the motion of the wave.

Thomas Grimshaw: Did I understand you to say you conducted the experiment in the underground?

Francesco Celani: Yes.

Thomas Grimshaw: Okay. Two-

Francesco Celani: Two thousand meter of screening.

Thomas Grimshaw: Okay.

Francesco Celani: Rocks and water.

Thomas Grimshaw: So... I'm sorry to misunderstand that.

Francesco Celani: Okay, okay, sorry. No, at the beginning it was [inaudible 00:10:30].

Thomas Grimshaw: Yeah.

Francesco Celani: At after one month, we move to underground.

Thomas Grimshaw: Okay.

Francesco Celani: There was steel under construction... Not so easy to stay there. Anyway.

Thomas Grimshaw: Yeah. Okay. And then you reported at the conference in Erice.

Francesco Celani: Okay, the [foreign language 00:10:48], the [inaudible 00:10:50] in Erice, because it take us week, two weeks. And later there was a conference in north of Italy, [inaudible 00:10:59] Society, in October something, 1089-

Thomas Grimshaw: Mm-hmm.

Francesco Celani: And we report there is a [inaudible 00:11:10]. It was published from the [inaudible 00:11:15] Society, a booklet, maybe twenty pages or so on. Maybe [inaudible 00:11:17], I can show you.

Thomas Grimshaw: Yes, I would be very interested to see the book, but then-

Francesco Celani: Beginning, beginning.

Thomas Grimshaw: Ah, well, that's very important, historically.

Francesco Celani: [inaudible 00:11:31] yes.

Thomas Grimshaw: Yeah.

Francesco Celani: But the point is, the main effort at the beginning still are the same. So it means this [inaudible 00:11:50] effort. It was [inaudible 00:11:51], so we have some chemistry together with us and the group and make a big group [inaudible 00:11:57]. And they say, "Mm, can be the flux, they [inaudible 00:12:05] from palladium where you take off the current, so it's moving. It was clear even one month after beginning. And physical explanation. One month, and, okay.

And later I went to [inaudible 00:12:32] years later Yusef, Carl Tralich, make a similar [inaudible 00:12:40] experiment at NASA-

Thomas Grimshaw: Okay.

Francesco Celani: And he show that what is the flux of [inaudible 00:12:48] along palladium tube [inaudible 00:12:54] of temperature.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: He was looking for [inaudible 00:12:59].

Thomas Grimshaw: So that's a-

Francesco Celani: That he found-

Thomas Grimshaw: Pralech?

Francesco Celani: Yah, Pralich.

Thomas Grimshaw: Yeah, okay. I just wanted to clarify.

Francesco Celani: Okay.

Thomas Grimshaw: Keep going.

Francesco Celani: And so the tracks it means moypolybium. So our feast, very simple idea, was complement, but we want to know about Fralich only 10 years later. Because the data in [inaudible 00:13:32] keep confidential.

Thomas Grimshaw: Okay. All right. Your experiments have been almost continuous through the years.

Francesco Celani: Yeah, about up down, not so easy to divide.

Thomas Grimshaw: Okay. So, off and on.

Francesco Celani: Ah, yeah. Off not completely. Even below the [inaudible 00:13:56] level, [inaudible 00:13:57] on.

Thomas Grimshaw: Okay.

Francesco Celani: But we can work continually mainly because the Japan scientist decided to enter in the field and that the effort of Japan in a way was strong.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: A loving act to survive is some time to [inaudible 00:14:18] enough money, sometimes very low. But because Japan make experiments, make report in [inaudible 00:14:26], the boss was Gagami, went to give Ivtolken, Pascati, Takash went here so to make efforts [inaudible 00:14:38] to provide.

Thomas Grimshaw: Okay, so that was Takahashi, and the first one was-

Francesco Celani: Ikagami.

Thomas Grimshaw: Ikagami, okay.

Francesco Celani: Hideo Ikagami was the big boss coordinator of [inaudible 00:14:48] at that time.

Thomas Grimshaw: Okay, all right. And so they came to Prescati to use your-

Francesco Celani: To talk.

Thomas Grimshaw: To talk, okay.

Francesco Celani: TO talk. Official talk.

Thomas Grimshaw: Okay. Good, and you were working with the Japanese during this time?

Francesco Celani: Yes, I work there. I work collaboration, because I feel they are honest people, so easy to give them secrets, more, okay?

Thomas Grimshaw: Yeah.

Francesco Celani: Like, secrets.

Thomas Grimshaw: Yeah.

Francesco Celani: And they don't cheat people.

Thomas Grimshaw: Yeah.

Francesco Celani: And at one point it's because I like to speak, so for me, it's difficult to be silent. [inaudible 00:15:30] people.

Thomas Grimshaw: People who will listen.

Francesco Celani: Yeah, yeah. But without saying too much.

Thomas Grimshaw: Okay.

Francesco Celani: That we exchange information, in beginning it was [inaudible 00:15:39].

Thomas Grimshaw: Okay. Well, that's wonderful, I did not... I was not aware of this exchange with Japan. And this would have been within the first five years or so after the announcement?

Francesco Celani: Not continual, almost continual.

Thomas Grimshaw: Continual? Okay.

Francesco Celani: Some up and down, but almost... Never stop. And, moreover, the material [inaudible 00:16:02] working were given from Tanaka company?

Thomas Grimshaw: Yeah, Tanaka Metals Company. Takahashi.

Francesco Celani: Takahashi. And there the people and Tanaka and the government decided to make a crosscheck with the data. So they give certain people, to give [inaudible 00:16:23]. And they select in America people who's died, who's killed. Mallove.

Thomas Grimshaw: Oh, Mallove. Gene Mallove.

Francesco Celani: Gene Mallove went to [inaudible 00:16:44], because collaborated with Scaramucci.

Thomas Grimshaw: Okay.

Francesco Celani: And to me.

Thomas Grimshaw: Okay.

Francesco Celani: And we made [inaudible 00:16:56] at Nagoya Conference.

Thomas Grimshaw: Okay.

Francesco Celani: It was the fifth conference.

Thomas Grimshaw: The fifth conference?

Francesco Celani: Yeah, with comparison about Takashi's house.

Thomas Grimshaw: Okay.

Francesco Celani: [inaudible 00:17:10] correlation.

Thomas Grimshaw: That would have been ICCF number five, in Nagoya?

Francesco Celani: No, no, no, no. Number two or three.

Thomas Grimshaw: Number... ICCF three? Okay.

Francesco Celani: Beginning.

Thomas Grimshaw: Okay.

Francesco Celani: Nagoya Conference.

Thomas Grimshaw: Very good. All right, well that's a-

Francesco Celani: Maybe a year to go here.

Thomas Grimshaw: Yeah.

Francesco Celani: If you like I can bring-

Thomas Grimshaw: Uh, we'll look at that when we look at your library.

Francesco Celani: Okay, okay.

Thomas Grimshaw: That will be good, yah. Good. Well, it's good to know, about this strong collaboration with Takahashi and others-

Francesco Celani: Yeah the people collaborate and [inaudible 00:17:41] because he was expecting catalysis.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: And all the Japanese scientists, I know several of them.

Thomas Grimshaw: Yeah.

Francesco Celani: And some years later [inaudible 00:17:54]

Thomas Grimshaw: Yeah. Iwamura, yes.

Francesco Celani: Iwamura. And, okay, I share all my data without secrets.

Thomas Grimshaw: Yes.

Francesco Celani: They give to me some device. They give some money for [inaudible 00:18:14]. I can pay some collaborators, okay. We collaborate.

Thomas Grimshaw: Yeah. And that continued from the very earliest time, up until very recently? Or?

Francesco Celani: Yes, some, yes.

Thomas Grimshaw: Okay.

Francesco Celani: Now I try to fi- Some years before, I was [inaudible 00:18:33] to go to Beshan because age limit?

Thomas Grimshaw: Oh, yes.

Francesco Celani: And then I try to find some money another way. And some government, some small company in Italy [inaudible 00:18:47] collaborate because, now they give all the money. Whole group. [inaudible 00:18:57] very, very big.

Thomas Grimshaw: Yes.

Francesco Celani: [inaudible 00:19:00]

Thomas Grimshaw: Yeah, so, remind me what year did you retire from IMFN here at Prescotti?

Francesco Celani: About 40 FB, before.

Thomas Grimshaw: Okay. Do you recall what year? 20?

Francesco Celani: Eh, 2017.

Thomas Grimshaw: 2017, thereabouts?

Francesco Celani: Yes. October. I don't remember-

Thomas Grimshaw: That's okay. But here we are today, in a beautiful sunshine day, in Prescotti, and we're right next to your laboratory, so you still are working here at Prescotti?

Francesco Celani: Yes, several people offer me to keep this laboratory. The most famous was Nobel Laureate Brian Josephson?

Thomas Grimshaw: Oh, yes.

Francesco Celani: He wrote an open letter.[inaudible 00:20:05] Open letter?

Thomas Grimshaw: Very good.

Francesco Celani: And after we make a request to our president of republic [inaudible 00:20:16]. I make a lot of noise.

Thomas Grimshaw: That's very good, because you were talking about Brian Josephson, the [inaudible 00:20:23] Prize for the Josephson Junction.

Francesco Celani: Yes.

Thomas Grimshaw: He went to bat for you at the highest levels here in Italy, and now you're back!

Francesco Celani: I meet him at [inaudible 00:20:35] before, so I ask please write something to let me-

Thomas Grimshaw: Wonderful.

Francesco Celani: ... to keep the laboratory. Without salary, but-

Thomas Grimshaw: Yeah.

Francesco Celani: And all [inaudible 00:20:44].

Thomas Grimshaw: Yeah, okay. Good. So you began... Your work ended in 2017-

Francesco Celani: Yes.

Thomas Grimshaw: And then began again here-

Francesco Celani: No, no. I was... I never leave my laboratory.

Thomas Grimshaw: Oh, you-

Francesco Celani: One day.

Thomas Grimshaw: Okay, that's good to know.

Francesco Celani: ... October-

Thomas Grimshaw: Okay.

Francesco Celani: ... when I was forced to go pension, but [inaudible 00:21:12] I say yeah, yeah.

Thomas Grimshaw: Okay. So, it's been continuous, even through your retirement, through this special arrangement. Well, we have a wonderful laboratory here. We'll take some pictures.

Francesco Celani: Very, very chaotic.

Thomas Grimshaw: Very chaotic. But you warned me, in advance.

Francesco Celani: Okay.

Thomas Grimshaw: But, to me, as I see it it's very typical of a laboratory, a cold fusion laboratory.

Francesco Celani: [inaudible 00:21:37] you need a lot of things, usually small place, so is [inaudible 00:21:46] house growing.

Thomas Grimshaw: Okay, so basically from 1989 to 2017, you were doing experiments, sometimes a lot, sometimes not so much? Up and down, yeah. Now, is there a way that you can characterize the sequence of experiments through those years?

Francesco Celani: Yes, in some way, maybe up to 2000, more of less, I'm working with palladium. Working [inaudible 00:22:17] we found even two new kinds of bacteria living in heavy water. This bacteria has the characteristics to absorb large amount of heavy metals. [inaudible 00:22:36] even uranium. And it was one, two year three me possible to increase my budget, because these side-

Thomas Grimshaw: Benefit?

Francesco Celani: ... side, uh, discovery?

Thomas Grimshaw: Yes.

Francesco Celani: And-

Thomas Grimshaw: And you said bacteria?

Francesco Celani: Bacteria.

Thomas Grimshaw: Very good.

Francesco Celani: Yeah. Name is rastonia detus scorianense, okay? [inaudible 00:23:07] a new bacteria [inaudible 00:23:12] national [inaudible 00:23:19] deposit United States and Japan. Deposit sequencing of bacteria, the DNA [inaudible 00:23:31].

Thomas Grimshaw: Okay.

Francesco Celani: And it was good, because people were interested and [inaudible 00:23:37] extra money to... of my work, and okay.

Thomas Grimshaw: Okay. Good, and this was-

Francesco Celani: Got lucky.

Thomas Grimshaw: Yeah, okay. Luck is important.

Francesco Celani: Ah!

Thomas Grimshaw: And so, was your work with bacteria, did it involve biological transmutation? Change of metals? No?

Francesco Celani: No, we cannot be sure. So I, we just seeing the [inaudible 00:24:06] bacteria is able to adsorb large... to survive in large amount of polluting materials, even mercury.

Thomas Grimshaw: Okay.

Francesco Celani: Like we've very... Now we're experiment. If use mercury, because a local concentration of the [inaudible 00:24:28] usually mercury is poisoning for [inaudible 00:24:31], but if are able to leave some area free mercury. All the current go such pre-area.

Thomas Grimshaw: Okay.

Francesco Celani: Will be able to local high loading, and just microns later, low-loading. So it unload the flux. High/low. The media always waver monypolybium, see?

Thomas Grimshaw: Oh, yeah. 'Kay. It's okay. Flies don't bother me. That's very interesting. So you were working with bacteria that was able to concentrate or work in very high levels of normally toxic metals-

Francesco Celani: Yes. Because the point is we add mercury to add some effect we found [inaudible 00:25:30] palladium, but we found some [inaudible 00:25:31] water, each things, this mercury disappear.

Thomas Grimshaw: Ah!

Francesco Celani: Where is? But I put, add. So I check again, it's true mercury. I make analysis, mercury, but where sometimes go?

Thomas Grimshaw: Yeah.

Francesco Celani: So we have no explanation until... and moreover, I hear some yogurt that went away, smelling. I tell you water after I experiment.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: So is growing, smelling, and disappearing mercury.

Thomas Grimshaw: Okay.

Francesco Celani: And then we discuss a lot, maybe several, six months. And that one my collaborator was a medical doctor, that's part in nuclear physics. Told "Okay, I have a friend in [inaudible 00:26:28] laboratory, very clever. Your chemistry just come back from England and United States.[inaudible 00:26:39] Better contact him. And after that we agreed they give some samples of heavy water after experiments. And they say, "Oh! Strange!" You have bacteria but it's not in the databank. Why? Impossible. No, I'm sure.[inaudible 00:27:01] collaborating quality guidance [inaudible 00:27:07] that divides for PCF

Thomas Grimshaw: Okay.

Francesco Celani: Prometh chain reaction. I say, "No, this bacteria don't exist in databank in every place in the world. You have a new bacteria." Right now

impossible, okay. Right now, PCF, testify [inaudible 00:27:26] new bacteria and we deposit national center [inaudible 00:27:35] information in United States.

Thomas Grimshaw: Well.

Francesco Celani: And then the databank [inaudible 00:27:39]

Thomas Grimshaw: Did the... do you have an explanation at this time, of what happened?

Francesco Celani: Oh, possible explanation.

Thomas Grimshaw: Transmutation, do you think?

Francesco Celani: No, I think just face original contamination, heavy water.[inaudible 00:28:03] But in our condition, the embodiment was proper to increase growing bacteria. They grow so much, they want to eat, and they eat what they have, is mercury. They eat the mercury. It's a strong [inaudible 00:28:26] material for the experiments.

Thomas Grimshaw: Okay.

Francesco Celani: Later we make it [inaudible 00:28:30] experiment. We concentrate this bacteria, and give them food: mercury. And later even uranium. And they eat uranium. And we have seen [inaudible 00:28:51] bacteria. The uranium was concentrated in their body, external body.

Thomas Grimshaw: Very interesting.

Francesco Celani: Very, very interesting.

Thomas Grimshaw: Yes.

Francesco Celani: So we propose to use [inaudible 00:29:01] even for decontamination of pollution of [inaudible 00:29:05]-

Thomas Grimshaw: Or nuclear waste?

Francesco Celani: Yeah, nuclear waste. Just concentration.

Thomas Grimshaw: Yeah.

Francesco Celani: But after two, three years, five years [inaudible 00:29:13] really apparent. Oh, yes, interesting. They give me some more money for the normal experiment, [inaudible 00:29:26] project to study deeply the contamination project is a concentration, never. I'm out of ideas [inaudible 00:29:37]

Thomas Grimshaw: Okay. Interesting, so it was biological concentration of the heavy metals.

Francesco Celani: Yeah.

Thomas Grimshaw: And so you worked on that for five years. Do you remember the approximate timeframe?

Francesco Celani: Yeah, from 2000 to 2005.

Thomas Grimshaw: Okay.

Francesco Celani: I published everything, so [inaudible 00:30:02].

Thomas Grimshaw: Okay. All right. And let's track back. Let's see. We are now at 30 minutes. We said we would a 30-minute segments. So this is a good time for a break.

Francesco Celani: Okay.

Thomas Grimshaw: So I'll end and we'll pick up again in a little while.

Francesco Celani: Okay.

Thomas Grimshaw: So this is Tom Grimshaw. I'm here with Francesco Celani. We're talking about his work in cold fusion, following the March 23rd, 1989 announcement, and the years since then, going up even to today. Today, where his laboratory at the INFN in Prescotti, and I think I should say that it's September 23rd, 2022. So Francesco, thank you for this, and we'll pick up again in a little while.

Francesco Celani: Okay.

## *A3. Third Segment*

Thomas Grimshaw: So we'll begin with the usual introduction. This is Tom Grimshaw. I'm here with Francesco Celani. It's September 23rd 2022. It's a beautiful day. We're outdoors near Francesco's laboratory here at INFN in Frascati. A gorgeous day. Thank you, Francesco, for making arrangements for such a beautiful day.

Francesco Celani: I know. Just God gives us something good.

Thomas Grimshaw: The purpose of our interview today is to review Doctor Celani's adventures in cold fusion starting within a few days. I think you said March 26th 1989 after the March 23rd announcement and even continuing in the cold fusion field in all the years since then, and it's my pleasure to be interviewing you today about your work in cold fusion. This is the third episode in this sequence of interviews. And Francesco, in the last sequence you had indicated that, of course, you started right away after the March 23rd announcement and you were using nuclear signatures rather excess heat as the indicator of cold fusion. I think you said 2000, 2005 you were working with microbes, bacteria-

Francesco Celani: Both, both. Yes. Side experiment.

Thomas Grimshaw: Very good. So let's go back in time to the that you can recall in the years up to that. Well let's say from 1990 on up to about 2000 where you decided to experiment. Tell us, if you would, the succession of activities in cold fusion that you recall.

Francesco Celani: In about 1992, I started replication of Takahashi experiments using as much as possible the same procedure of Takahashi. Same composition, same plastic cell, everything still the same. And special electronics. We use it for the time to [inaudible 00:02:54] and square wave agitation. Six hours I remember to date. And we have found some effects and more over, we found that change in the kind of plates, material plates, changed largely different from some they enabled effects. But most lower than Takahashi, maybe five times lower than I remember. But moved the table to almost zero when we changed the palladium plate from another company or even the same company but in different batch of production.

For us, it was very, very surprising. While just changing the palladium, you change the effect. We worried about some mistakes somewhere, but we checked. No mistakes. Just changed the material, it changed the effect. And so, I spoke deeply with the people, the [inaudible 00:04:15] company, that has the duty to provide materials to other sites in the world. And-

Thomas Grimshaw: Tanaka Metals, yes.

Francesco Celani: Tanaka Metals. It was a girl, a nice girl, speaks enough well English.

Thomas Grimshaw: Very good.

Francesco Celani: And it was really nice to be true, and we were in contact continuously by phone and try to understand on why changing, material changed everything. Until I meet at the Nagoya conference and, to my imagination, from just the boys. It was nice. And then after we contact regularly. She was in chemistry and sometimes we moved from science interest to private interest, and after we married. Side effect of cold fusion. The people joked about the story and you changed from cold fusion to hot fusion. That's different.

Thomas Grimshaw: That's very funny.

Francesco Celani: Very funny.

Thomas Grimshaw: Well good for you.

Francesco Celani: Yeah. Good, good. Maybe you know her? No. Oh, never. I have a picture.

Thomas Grimshaw: Sure.

Francesco Celani: You can make the picture where we married. Italian [inaudible 00:05:53] Tokyo. Maybe you could see.

Thomas Grimshaw: Oh, very nice. Yes.

Francesco Celani: Yeah, yeah. Me too. I was nice. Now almost in a way I'm white. Anyway, at that time I was good enough.

Thomas Grimshaw: Well that's wonderful. I did not know that you had married a lady from Tanaka Metals.

Francesco Celani: Just because of cold fusion.

Thomas Grimshaw: Cold fusion found you? Okay. Are you still married?

Francesco Celani: Sure.

Thomas Grimshaw: Yeah?

Francesco Celani: Yeah. She's a very old style woman. Different Japanese.

Thomas Grimshaw: Tell me her name.

Francesco Celani: Misa.

Thomas Grimshaw: Misa?

Francesco Celani: Misa Nakamura. We published it together because when I come back home in the evening, we discussed the result, we discuss from the sheet about the chemical point of view physically. So we fight, but it's okay.

Thomas Grimshaw: Well that's very, very interesting. I did not know that.

Francesco Celani: She knows our papers. She was out there because I bring it up.

Thomas Grimshaw: Yes. Very, very interesting. Well congratulations. That's wonderful.

Francesco Celani: Oh thank you.

Thomas Grimshaw: You and Jed Rothwell, who also has a very beautiful Japanese wife. Very good. So you had a side-

Francesco Celani: The point is about the Takahashi experiment. After that, we finished planned application because I had some expertise in electronics. And I remember the effort after only during [inaudible 00:07:42] condition. Also, in the Takahashi experiments, the effect happened during the change of the current from low to high and vanished in the [inaudible 00:07:53], almost vanished [inaudible 00:07:56] condition, and [inaudible 00:07:57] during from high to low from on to off that it would vanish again. [inaudible 00:08:04] to a point is the [inaudible 00:08:06] confirmation. So we decided to make continuous [inaudible 00:08:12] lithium using high powered pulse. I was an expert in electronics. I sliced some of this.

Thomas Grimshaw: Good. And I should ask, you were directly with Takahashi at this time?

Francesco Celani: We collaborated.

Thomas Grimshaw: Collaborated.

Francesco Celani: We exchanged data. I did the tool in his laboratory, so he came to me, so we collaborated. He should give you all of it. He was very open, so for me it's good. And I started to do a very powerful pulser and this pulser has to be mentioned for the agreed continuance. So we did this before, but the plates are large to need a lot of current, but the distance is short, so it means the voltage is not too much voltage [inaudible 00:09:15]. And we make good pulse short [inaudible 00:09:21].

Thomas Grimshaw: We'll pause for a moment. Okay, we had a brief pause in our conversation there for a phone call and a visit, but we're back now.

Francesco Celani: [inaudible 00:09:38] to come today because it's very [inaudible 00:09:39], but he has private problems. So sorry, he cannot come.

Thomas Grimshaw: No problem.

Francesco Celani: No problem.

Thomas Grimshaw: No problem for us. So why don't you pick up, if you would, Francesco. You were talking about the work you were doing in collaboration with Takahashi and using samples from Tanaka Metals, and you had a side benefit with a woman that you married and are still married to. Wonderful.

Francesco Celani: And two daughters.

Thomas Grimshaw: Very good. So she has a doctorate also?

Francesco Celani: Yes. The first is doing master's in bio chemistry. And the second just finished senior high school, and there was a winner to enter medical doctor. She was one of the best. So really, really clever.

Thomas Grimshaw: Very good.

Francesco Celani: More clever than me. They studied everything. I just studied what they want, but they studied everything. More serious, like the wife.

Thomas Grimshaw: Well there are some similarities there too because my wife is-

Francesco Celani: Ah, clever.

Thomas Grimshaw: ... also clever. Yes. Did she practice as a physician after you-

Francesco Celani: Your wife?

Thomas Grimshaw: No, your wife.

Francesco Celani: No. But my wife helped me for the chemistry aspect. My daughter just entered-

Thomas Grimshaw: Oh, your daughter? Okay.

Francesco Celani: That small daughter just two days we get a letter that she was the winner [inaudible 00:11:13]. Now to enter in a medical faculty, it's made to be very, very difficult. And she made the national test and she won both the Italian lesson or in English lesson. So very clever. Not like me.

Thomas Grimshaw: Inherited from her mother, no doubt. From both of you. Very good. Well congratulations through you to her. So you were in the early years after you did the confirmation work for Fleishmann and Pons, then you were working with Takahashi and Tanaka Metals samples, which is by the way very characteristic of cold fusion that whether or not you achieved success in the effect depends upon the sample that you use.

Francesco Celani: It was very strange from my point of view of physicist. I suppose the samples are all the same, but not totally. Later we found even you make ruling of the plate, a new plate, et cetera because it's a material. It's a cold water effect. The amount of agonists and the line during the rolling is, at a distance, two millimeter or two microns makes a difference. So for me, it was totally new in effect.

Thomas Grimshaw: The physical properties and the crystal-

Francesco Celani: Metallurgical.

Thomas Grimshaw: Metallurgical.

Francesco Celani: And aside metallurgical, for these materials depends on the history of work you've done, how you melt it in, the purity during the melting, the control for the purity, a lot of parameters.

Thomas Grimshaw: A lot of parameter space.

Francesco Celani: Not all still now is correct. Several made progress, but are not yet finished [inaudible 00:13:38].

Thomas Grimshaw: I agree. That's certainly been one of the problems of the field. You work with Takahashi or collaborated. What came next after your marriage?

Francesco Celani: Because largely of my experience, the aspects, and often the Takahashi experiments, the effect happened mainly during the transition time. So in the case of Takahashi produce low high current. I remember from 0.2 ampere low current to high ampere. And in this time, there is a larger effect of [inaudible 00:14:25]. In the flat radeon, six hours it almost disappears, and then everything happened again when we just make a comparison with light water and different variables. Let's say, "Okay. There is during the transition." So we spoke also with Mr. Makoto Okamoto at Polytech Technical Institute in Tokyo, and he told me [inaudible 00:15:00] how to increase the flux or add gradients. This was the main job, my job, from the beginning. All my efforts were, they wanted to increase flux. This [inaudible 00:15:59] energy output. Extended energy output.

Thomas Grimshaw: And remind me or tell me again who you were working with at this time, which person?

Francesco Celani: Mr. Makoto Okamoto.

Thomas Grimshaw: Makoto Okamoto.

Francesco Celani: Okamoto. He was a director at [inaudible 00:16:15] Junior and was director at the [inaudible 00:16:20] reactor in [inaudible 00:16:26]. And he organized also the conference in Sapporo.

Thomas Grimshaw: Sapporo? Yes.

Francesco Celani: One of the co-organizers.

Thomas Grimshaw: With Akita-

Francesco Celani: Akita Takahashi? No. Makoto Okamoto and he was very close to Japan Development together with NHA Group. New Energy [inaudible 00:17:01] Energy Group.

Thomas Grimshaw: NEH.

Francesco Celani: He was one of the organizers.

Thomas Grimshaw: I was trying to think of his name. I think it was Akagini ... I can't think of his name now.

Francesco Celani: Makoto Okamoto. Before I was [inaudible 00:17:18] in Italy, so he speaks Italian and even Latin.

Thomas Grimshaw: Really?

Francesco Celani: Yeah. Because he was grown from Trieste. A long story. He grew up in Trieste and he knows Latin.

Thomas Grimshaw: So you were really focusing on flux of the deuterium within the palladium within the high concentration to the low concentration side.

Francesco Celani: Or vice versa. If you're forcing with electric, you have from low to high. But it's always flux. Spontaneous flux, when you take off energy, force it when you give energy. The point is to have such total effect with post balance.

Thomas Grimshaw: So do you feel that you were successful in achieving the cold fusion effect during that time?

Francesco Celani: Yes. Totally enough [inaudible 00:18:45] despite. I am improving my understand these days. Step by step, slowly, but [inaudible 00:18:45] the day before. So it's okay.

Thomas Grimshaw: And previously when you were working with Tanaka Metals, did you feel that you observed the cold fusion effect during that time?

Francesco Celani: Yes. With some of the palladium plate, from Tanaka deuterium plate, and Takahashi purchased it, it's okay. It's the same. So they even proved something is possible. When we get nothing, it's a proof because if I make systematic errors, when you have again, we see a result. No. Bad material, no result. Good material, good results. Or contamination or several things can happen in the material. So it is proof. No big numbers as we liked. So you'll always to increase the effect reducing the power to notice. Really notice.

Thomas Grimshaw: In other words, coefficient of performance, trying to increase the ratio of the output power to the input power, always incrementally trying to increase.

Francesco Celani: One point is at a low total power in a geometric aspect, the coe is larger. When we go to high power, the coe is lower. So it means some self

limiting effect somewhere that we are able to discover. So low power, but you are always at risk of maybe some mistake, some systematic error somewhere. So high power is better. Anyway, they drained it. So it means there is some intrinsic rate of energy production given some amount of materials [inaudible 00:20:38]. Or the rate is constant. So if we give high power, you just reduce your-

Thomas Grimshaw: Input?

Francesco Celani: Yeah.

Thomas Grimshaw: Input. Reduce the denominator. Yes, I understand. So, I think that was phase one, two, three.

Francesco Celani: Sorry?

Thomas Grimshaw: Phase one was when you worked to verify. Phase two was with-

Francesco Celani: My phase two was because I was an expert in electronics, high powered electronics, I [inaudible 00:21:17] special [inaudible 00:21:18] able to work with a grid system. But at the very short time, not six hours, but three microseconds.

Thomas Grimshaw: Oh okay.

Francesco Celani: Three microseconds on some waiting time [inaudible 00:21:44]. But in three microseconds, the current in some experiment, they arrive up to 200 amperes. Very big one. Big number [inaudible 00:21:53] palladium plate. After then, we move to palladium white, the big current was lower. Otherwise, it's destroyed. But the power then usually was larger from one kilowatt gram up to 20 kilowatts per gram of material. As it's larger, it's better. But if you make too much power, nothing happens. For these optimal point somewhere, it depends upon the material, history and so on. So it's the root to be operated, to be clarified. There is an increasing [inaudible 00:22:42]. This helps for confidential that we don't make any mistakes in the experiment, but also that we are trying to find the optimal window of operation. And the windows change upon the previous history of the material. It is a very strong memory effect. The main material and solution in the case of [inaudible 00:23:15] because it can change, the pH change, deposit of materials, so really, really complicated.

Thomas Grimshaw: We've known for some time that the materials of the palladium is a huge difference. It's very controlling with the large parameter space involved in the materials is very challenging. So in terms of your sequence in cold fusion studies, you began with Fleischmann and Pons using nuclear signature-

Francesco Celani: Just the detection. After that we moved from [inaudible 00:24:01] laboratory to a normal laboratory because the stay in [inaudible 00:24:11] is very expensive. Very, very expensive. Our money finished and we moved to a normal laboratory [inaudible 00:24:17]. And

[inaudible 00:24:20] inside the laboratory make the people [inaudible 00:24:26] from us. We have no sun, so you have change from black and white. Not [inaudible 00:24:36], it's okay.

Thomas Grimshaw: [inaudible 00:24:36].

Francesco Celani: And more over, in [inaudible 00:24:41], we had a very nice experiment using the fractal fusion phenomena when we-

Thomas Grimshaw: Fractal fusion.

Francesco Celani: Fractal fusion. And we demonstrate if possible. We use concrete loaded with light water and heavy water for comparison, and we found during the ... We use path coating concrete, special kind, and during the centering in a way, the concrete, with the light water there's almost no effect or very little. With heavy water, we have several microns out of the ground and we presented such data at the conference of the '90s of Stephen Jones at the [inaudible 00:25:41] University. So it was published there. He was very happy to find some from very stupid ... So he was proud. Not totally with sophisticated material, just the concrete. And more over, at a point, this should be really interesting because I was an expert in superconductors, I prepared several samples of the conductors myself, and I loaded with the deuterium, I [inaudible 00:26:22] as a way to load by just putting and I make cycling to have [inaudible 00:26:32]. And we found it is during the transition of the material to the conductors from the super conductive state to normal state or vice versa, there is some [inaudible 00:26:46] combination. Again, during-

Thomas Grimshaw: Transition.

Francesco Celani: ... transition.

Thomas Grimshaw: Flux again.

Francesco Celani: With rhodium, this effect was very, very [inaudible 00:26:46]. So not zero, but little with the material. Without rhodium deuterium, nothing happened. Just [inaudible 00:27:06], nothing happened. But to be sure, zero with [inaudible 00:27:11], some with rhodium, larger with deuterium. So this is possible.

Thomas Grimshaw: And these are superconductor materials?

Francesco Celani: Yeah. YBCO. Yttrium barium copper oxide when we have a pattern [inaudible 00:27:27].

Thomas Grimshaw: Oh okay. Good. All right. We're almost at 30 minutes and I'm going to have to put my charger on the phone, so I think this is another time to take a break. So this is Tom Grimshaw here with Francesco Celani. We're talking about his work in the cold fusion area going back to the very beginning. It's September 23rd. We're here in Frascati at

Francesco's laboratory. So thank you again, Francesco, and we'll pick this up for another segment soon. Take care.

Francesco Celani: You need to change to-

## *A4. Fourth Segment*

Thomas Grimshaw: Okay, this is the third set of the sequence of interviews with Francesco Celani. This is Tom Grimshaw. We are here in Frascati. It is September the 23rd. And Francesco, I think we are off to a very good start in the first sessions that we've had. We'll continue to work on the sequence of things that you did, so we can establish a timeline.

And I think the first thing that you told me you worked on was, of course, the Fleischmann-Pons replication or affirmation, I should say, because you were using a different signature. You were using nuclear signatures, not excess heat. So let's pick it up. And then you worked with TANAKA Metals and then you worked with, I think, Takahashi you said?

Francesco Celani: Yeah.

Thomas Grimshaw: So let me ... I'm sorry to keep coming closer for this.

Francesco Celani: Okay. Oh, okay. So the point is I worked with Tanaka material plate and, about one year, following as much possible his procedure. Because during this test, I realized that again the thermal effect happened mainly during the transition time from low to high concentration or vice-versa. I think that okay, I have to increase the numbers of transition time and transition events. So I developed a special pulsar to give proper power to the plate. So the pulsar has the advantage. You can give very large power for short time. The disadvantage, you cannot go continually. Otherwise, the power will be giant, megawatt, impossible. You had to keep about 30, 50 watts, the same range of Takahashi procedure. And you have to give large power for short time, so you need a special device to detect. And I developed a capacity discharge procedure.

I start usually at 100, that's the initial rate. And they found that increasing the frequency in fact increase for me the number of pulses in time. I reduced the pulse ration from 10 microseconds up to five, three, two, for this minimum time but ... So I make progress in order to minimize the energy needed to produce the pulse. So I developed a completely new electronics which advantage is to have a capacity discharge project at very high efficacy, even about a current convention so you can see the pulse.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: Usually, now is [inaudible 00:03:44] captivity charge is very efficient, up to 100 [inaudible 00:03:47] one kilowatt. But over, the efficiency drops because you need to [inaudible 00:03:54] the pulse cessation to the DC power supply. So you need the large resistor, large [inaudible 00:04:02] to transform, whatever, are DC developments [inaudible 00:04:06].

I made a special valve that way to decouple. And timely, the power supply DC to the pulse cessation. And it make a lot of efforts because the timing is very, very limited. The last time of the pulse was less than one microsecond.

Thomas Grimshaw: Wow.

Francesco Celani: [inaudible 00:04:36] which of power of kilowatt [inaudible 00:04:45] in a short time. So it was really [inaudible 00:04:45]. Anyway ...

Thomas Grimshaw: Mm-hmm.

Francesco Celani: I could see it. And we can work up to 20, 50 kilowatts even. Such a [inaudible 00:04:53] for pulsing, but still our secret, our group. Nobody know. And that they are partners to the [inaudible 00:05:03] how to make such good timing without destroying the [inaudible 00:05:10] material.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: Anyway, it works. And we have confirmation that the pulsing, that the number of pulse, proper, depends on the temperature of concentration. I saw some effect, even concentration of [inaudible 00:05:31] it's effects. And [inaudible 00:05:35] so we move from 0.1 molar of zero and three of Fleischmann-Pons, to 10 times 100 molar. So the macromolar region.

Thomas Grimshaw: Okay.

Francesco Celani: And moreover, we have pulse total ... We have the total, is ... With the pulse duration of two microseconds duration. And the electrochemistry convention did bring me. So we have a lot [inaudible 00:06:12] discussion amongst them. Even Fleischmann didn't believe I could make the [inaudible 00:06:19] even with the [inaudible 00:06:22] microsecond of the pulse. And he came several times to my laboratory, together with the Pons, to check that is really working. At the end, they say okay, I have to accept. He walked back. He didn't know. So Celani, thanks.

Thomas Grimshaw: Okay. Yeah. So this is to Pascati by Martin Fleischmann?

Francesco Celani: Yeah, several times.

Thomas Grimshaw: Yeah. Very good.

Francesco Celani: And so that was good contact with the Japanese. They came several times to my laboratory. Pascati, Professor Enio, that was one of the most famous in [inaudible 00:06:58] chemistry in Japan, of that

university. Professor [inaudible 00:07:02] from Yokohama University Chemistry, and other people. It even ... Eva Moora at that time was a young girl, young [inaudible 00:07:14].

Thomas Grimshaw: Yeah. Eva Moora. What was the first name you mentioned before the-

Francesco Celani: [inaudible 00:07:18].

Thomas Grimshaw: [inaudible 00:07:19] okay. And you mentioned someone before Eva Moora?

Francesco Celani: Oh, together ... Enio, Professor Enio.

Thomas Grimshaw: Enio? Okay.

Francesco Celani: This was a very respectable electrochemistry.

Thomas Grimshaw: Okay.

Francesco Celani: [inaudible 00:07:35] university.

Thomas Grimshaw: Okay.

Francesco Celani: Professor [inaudible 00:07:37] from University of Yokohama, chemistry [inaudible 00:07:44].

Thomas Grimshaw: Okay.

Francesco Celani: So several people, they don't believe me. Just say impossible.

Thomas Grimshaw: Yeah.

Francesco Celani: But say okay, it happen. We accept the reality. But later, we went to know that in the 1905 some German people has done the same things.

Thomas Grimshaw: Yes.

Francesco Celani: Pulsing the [inaudible 00:08:07].

Thomas Grimshaw: Paneth and Peters? Oh, no?

Francesco Celani: No. No, Paneth, no, later. No.

Thomas Grimshaw: Later then. Oh.

Francesco Celani: We can speak about [inaudible 00:08:16] the critical aspects.

Thomas Grimshaw: Okay.

Francesco Celani: They use a mechanical switch.

Thomas Grimshaw: Yeah.

Francesco Celani: And they found, because that's the time, that even with a few microseconds was possible to get electrolysis.

Thomas Grimshaw: Okay.

Francesco Celani: So later we published a very large paper in the [inaudible 00:08:29] journal.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: We did 50 page.

Thomas Grimshaw: Oh.

Francesco Celani: It was very big.

Thomas Grimshaw: Yeah, that's great. Unusual.

Francesco Celani: They were called [inaudible 00:08:43]. They wanted a constitution.

Thomas Grimshaw: Yeah.

Francesco Celani: 1996, 5-6.

Thomas Grimshaw: Okay.

Francesco Celani: So, it was our work. We were happy at this point. But at the same line, we move it from the plates to wires.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: Because one of my friends is a professor at the time, Professor Giuliano Preparata, and a model-

Thomas Grimshaw: Preparata?

Francesco Celani: Preparata.

Thomas Grimshaw: Okay. I interject on the names from time to time, you know what I mean.

Francesco Celani: Oh, okay. Giuliano Preparata. And a model that using wires as a longest possible, I think it's possible. Yeah, it's possible to have increasing [inaudible 00:09:24] effect because the currents of the system. The current was very, very difficult to achieve.

Thomas Grimshaw: Mm-hmm.

Francesco Celani: Sometimes, we achieve two times. But what happen, we get the other [inaudible 00:09:38] results. But really, we don't know how [inaudible 00:09:40] of some proper condition we call The Preparata [inaudible 00:09:52].

[inaudible 00:09:53].

Thomas Grimshaw: Okay. I need to stop for a moment.

Francesco Celani: Okay. Now we can go to eat. No?

## *A5. Fifth Segment*

Thomas Grimshaw: So this is Tom Grimshaw with Francesco Celani on September 23rd. We're doing an interview of his work in cold fusion. And Francesco, I

think we had a sudden end to the last conference, do you remember where we were? Where to pick up? I think you were working... Let's see you were working with... On the... It was after you did the Tanaka metals, and then you were working... What was next after that?

Francesco Celani: Next I try to improve the discovery of Takashi.

Thomas Grimshaw: Okay.

Francesco Celani: About low-high [inaudible 00:00:53], but the drawback of Takashi materials... To [inaudible 00:00:59] depends too much on the metallurgy of the materials.

Thomas Grimshaw: Right.

Francesco Celani: Some parameters were understood, some others not, so I try my own way using the palladium... Like the best palladium from Tanaka but we start using the [inaudible 00:01:27] because after happened during transition. So we have to find a way to maximize the transition, [inaudible 00:01:40].

And before I would try [inaudible 00:01:40] decreasing the time of the on-off, [inaudible 00:01:53] go for six hours, we move to three [inaudible 00:01:59] six hours, up to three hours, one hour without, but no real progress, so we change. Okay, now we pass, we pass sometimes [inaudible 00:02:12] quite nice. And after using palladium plate we move to [inaudible 00:02:22]. Following the idea of my professor, Giuliano Preparata.

Thomas Grimshaw: Giuliano Preparata. Yes.

Francesco Celani: He was sometimes like my teacher when I was young.

Thomas Grimshaw: Okay.

Francesco Celani: Yeah.

Thomas Grimshaw: I did not know that.

Francesco Celani: Okay.

Thomas Grimshaw: Okay. Good.

Francesco Celani: He was a terrible teacher. [inaudible 00:02:43]. And then after we make friends, and according to him there is possibility in some proper conditions to have [inaudible 00:02:56] of the [inaudible 00:02:58] inside the material and to promote [inaudible 00:03:08] the best geometry is wide, it is wide as can be, as long as possible, as thin as possible. Palladium is a weak material, especially after the [inaudible 00:03:25] easy to break.

Anyway, sometimes we are able to get [inaudible 00:03:34] and the [inaudible 00:03:37] we got were extraordinary levels but for a short time. So we cannot... Practicality, we

cannot show to the company because it was too short time but it was so big that it was unprofitable.

Thomas Grimshaw: When you say big, by which signature?

Francesco Celani: [inaudible 00:04:03] and even other effects, like apparently super conductors even at room temperature, during [inaudible 00:04:04].

Thomas Grimshaw: Okay.

Francesco Celani: Very strange effect, never understood to me, because material break but sometimes, some hours it works so enough to convince us, me, Michael Obrago. Giuliano Preparata came to my laboratory to [inaudible 00:04:04] that really [inaudible 00:04:42].

Thomas Grimshaw: Okay. And what was the name again, who came?

Francesco Celani: Giuliano Preparata.

Thomas Grimshaw: Oh, so it was Preparata. Okay, thank you.

Francesco Celani: Just for... joke for... But it's real. In 1995... the girlfriend, later wife, came to visit me in December... in time of Christmas, Christmas time, and July 23, two days trip around, and 26 this day, the laboratory, this laboratory with [inaudible 00:05:26] Preparata, my fiancee at the time, and other two collaborators and to make experiment. Yesterday after Christmas.

Thomas Grimshaw: Okay.

Francesco Celani: So the security people came, "What happened, what happened?". Long story. They spoke long time but [inaudible 00:05:48]. Okay.

Thomas Grimshaw: Good.

Francesco Celani: And they [inaudible 00:05:59] say possible, sometimes we verify, but [inaudible 00:06:04]. So we move to... Make some improvements to this [inaudible 00:06:15] in order to be able to get [inaudible 00:06:19]. So we move from [inaudible 00:06:22] condition, usually with better results but each break.

Thomas Grimshaw: Yeah.

Francesco Celani: [inaudible 00:06:30] condition and we change the electrolyte, from heavy water to heavy [inaudible 00:06:39]. And we had some addition, [inaudible 00:06:47] or sometimes [inaudible 00:06:51] some glass [inaudible 00:06:59] glass over [inaudible 00:07:00].

Thomas Grimshaw: Yeah.

Francesco Celani: And because to stabilize the effort, we add mercury, so some mercury lock the loading.

Thomas Grimshaw: Okay, yeah. On the surface?

Francesco Celani: Yes.

Thomas Grimshaw: You're creating the surface?

Francesco Celani: No, I'm just putting the solution.

Thomas Grimshaw: Okay.

Francesco Celani: Mercury chloride.

Thomas Grimshaw: Okay.

Francesco Celani: [inaudible 00:07:19] before I load up the mercury to lock.

Thomas Grimshaw: Okay.

Francesco Celani: Sometimes I see that the loading in the water really large, and one drawback will be the large current in making the loading and so on. During... Playing with this [inaudible 00:07:20] we found that no power is... It works. [inaudible 00:07:56] works well almost always with light water, but sometimes with heavy, heavy water each [inaudible 00:08:05] that after adding mercury and effects, the mercury disappears. And then we have no explanation until we smell some bad odor from the heavy water, like yogurt, like destroy the yogurt, like eat.

Thomas Grimshaw: Yeah.

Francesco Celani: Very bad, so I tried to ask my colleagues what I can do and after six months, before we go crazy they said, yeah. We analyze the heavy water in a [inaudible 00:08:54] laboratory of NRA, but not here in another place [inaudible 00:08:59]. Not a problem, we're working [inaudible 00:09:08] just came back from England and United States and he has advance instrumentation at that time.

Thomas Grimshaw: He was ENEA you said?

Francesco Celani: Yes.

Thomas Grimshaw: Yes, but you were working with him there?

Francesco Celani: Yeah.

Thomas Grimshaw: Okay.

Francesco Celani: Collaborate.

Thomas Grimshaw: Okay, wonderful.

Francesco Celani: Yeah, and so we [inaudible 00:09:32] heavy water and that's maybe one week for me, "Oh, Francesco, you have something strange in your water, I understand why, so it's made,", "Oh, so I'm not crazy,", "No, it's [inaudible 00:10:32],", "What is?", "Bacteria", "What?", "Bacteria", "Okay, but which kind of bacteria?", "This bacteria don't exist, but it's bacteria, it exists, it's a new kind".

So after some time we ask collaboration, specific project from [inaudible 00:10:35] project [inaudible 00:10:35] that is [inaudible 00:10:19] more advance instrumentation, ETR analyzes, and we discovered that it was

new kind of bacteria we [inaudible 00:11:26] heavy water. This bacteria after we demonstrate is able to survive even [inaudible 00:11:26] in solution [inaudible 00:11:26] concentration of heavy metals.

Thomas Grimshaw: Yeah.

Francesco Celani: [inaudible 00:11:26], mercury, and regularly test even [inaudible 00:11:26], make special test, running nothing [inaudible 00:11:26].

Thomas Grimshaw: Yeah.

Francesco Celani: [inaudible 00:11:26] running. And then bacteria was new, so [inaudible 00:11:26] in data bank [inaudible 00:11:26] United States, National Center Biology Information and in parallel data [inaudible 00:11:28] Japan. [inaudible 00:11:31]. Japan, the name we found no problem [inaudible 00:11:35] two kinds, at least two times, one is named Ralstonia [inaudible 00:11:42].

Thomas Grimshaw: Okay.

Francesco Celani: The second is [inaudible 00:11:46] Pseudomonas [inaudible 00:11:48]. Ralstonia is almost no dangerous, [inaudible 00:11:51] Pseudomonas is bad for the body. That's important.

Thomas Grimshaw: Yes. I'm familiar with Pseudomonas.

Francesco Celani: [inaudible 00:12:01] Pseudomonas is not good.

Thomas Grimshaw: Yeah.

Francesco Celani: Make lung-

Thomas Grimshaw: Lung.

Francesco Celani: [inaudible 00:12:13] problem.

Thomas Grimshaw: Also UTI.

Francesco Celani: Yeah. Okay, but this can be dangerous.

Thomas Grimshaw: Yep.

Francesco Celani: Anyway, but one is able to absorb heavy metals a lot. So [inaudible 00:12:22] to decide and we make a specific project, experiment to use such kind of bacteria but no real... practical experiments just chat, a lot of meetings everywhere with army people, with government people, but real no... No practicals.

Thomas Grimshaw: Okay.

Francesco Celani: Just talk. So... And more over this kind of bacteria is able to use [inaudible 00:13:00] from [inaudible 00:13:01]. So I went to Japan to meet people that has some experience and we contact that... I need to make my own experiment of [inaudible 00:14:17], but I need a lot of money and this money never arrived and specialized instrumentation [inaudible 00:14:17]. So we have to repeat [inaudible 00:14:17].

Thomas Grimshaw: Sounds like a very promising-

Francesco Celani: And another point, important, such bacteria it [inaudible 00:14:17] to eat. So we start to promote an experiment to deliver this bacteria in an open field where there are mines in order to eat because the mines are not... They are really tight, some leakage but they are very small, less than 200 nanometers, [inaudible 00:14:21], very small so they can enter.

Thomas Grimshaw: Yes.

Francesco Celani: They enter there, they eat [inaudible 00:14:29] and after, so we make some calculation, in six months in open field one typical mine will be destroyed. So this was dangerous [inaudible 00:14:47] army, they say a lot, "Okay, yes," but expand no practical, "I see it", or "I don't know" but no practical experiment.

Thomas Grimshaw: Okay.

Francesco Celani: Yeah, so [inaudible 00:15:00] saying blah, blah, but nothing there real.

Thomas Grimshaw: Okay.

Francesco Celani: I don't know what happened.

Thomas Grimshaw: Yeah, okay, I hear you. Okay. So you told me a little about that in our earlier interview this morning.

Francesco Celani: Yes.

Thomas Grimshaw: And so this was the work after the Tanaka work?

Francesco Celani: 2003, four.

Thomas Grimshaw: Yeah, okay, I want to make a note of that here.

Francesco Celani: More or less. [inaudible 00:15:28] 2000.

Thomas Grimshaw: Okay, all right.

Francesco Celani: 2004, five, I finish [inaudible 00:15:35] because no money.

Thomas Grimshaw: Right, I understand. Okay.

Francesco Celani: I [inaudible 00:15:41] because money was low. But we realize that there was a better [inaudible 00:15:51] instead of [inaudible 00:15:54] and we use this electrolysis, gas loading [inaudible 00:16:03] practical.

Thomas Grimshaw: So everything prior to was electrolytic cells.

Francesco Celani: Most.

Thomas Grimshaw: Mostly, yeah. And now you've moved into gas loading.

Francesco Celani: Gas loading.

Thomas Grimshaw: Wonderful.

Francesco Celani: Before with palladium, but palladium was several times was break, but anyway with good result in proper condition, coating, and so on.

And nickel-wise, but more difficult with nickel-wise [inaudible 00:16:37]. It sometimes worked, until for a strange idea I move it to constantan, 2011.

Thomas Grimshaw: Okay. Very good.

Francesco Celani: For [inaudible 00:16:49] changing [inaudible 00:16:52] I change back to palladium-wise.

Thomas Grimshaw: Okay, to a constant 10 where you get both nickel-

Francesco Celani: Yes, we get-

Thomas Grimshaw: ...Copper.

Francesco Celani: ...Very low, very low... Very low [inaudible 00:17:06].

Thomas Grimshaw: Very low.

Francesco Celani: [inaudible 00:17:09]. Sometimes was, but usually nothing.

Thomas Grimshaw: Yeah.

Francesco Celani: So palladium always better until break.

Thomas Grimshaw: Yeah.

Francesco Celani: [inaudible 00:17:18].

Thomas Grimshaw: Difficult choice.

Francesco Celani: Yeah. Break or-

Thomas Grimshaw: Break or give results.

Francesco Celani: Or nothing.

Thomas Grimshaw: Yeah, I hear.

Francesco Celani: [inaudible 00:17:25].

Thomas Grimshaw: Yeah. Okay.

Francesco Celani: And then 2011 I went to constantan for a lot of strange condition.

Thomas Grimshaw: Okay.

Francesco Celani: And you can try it.

Thomas Grimshaw: Okay. I better catch that. Okay, constantan.

Francesco Celani: [inaudible 00:17:46] alloy [inaudible 00:17:46] alloy mixed with some [inaudible 00:17:48].

Thomas Grimshaw: Yep.

Francesco Celani: And constantan, they ask around and I was lucky to find a very old box [inaudible 00:18:03], constantan they hold 40, 50 years very old. And it was a rush [inaudible 00:18:14] so there is [inaudible 00:18:18].

Anyway I clean it away, wash, [inaudible 00:18:23], and they use [inaudible 00:18:24] constantan works with some effects and [inaudible 00:18:36] condition but [inaudible 00:18:39], okay, I need to modify from this [inaudible 00:18:41] to [inaudible 00:18:45] to increase the space and I use [inaudible 00:18:50] condition with the constantan but it's a longer time, 12 000 was about 50 millisecond duration and the [inaudible 00:19:02] 0.1 [inaudible 00:19:04]. Each 10 second, one pass.

So the [inaudible 00:19:12] was modified and the fifth batch of [inaudible 00:19:18] 10, 20 [inaudible 00:20:21]. Almost [inaudible 00:20:21]. And it was famous, but that's when the [inaudible 00:20:21] finish, I try another batch but I start to work lower intensity so I really I don't know what to do, so [inaudible 00:20:21] myself. And I try to collect even the piece broken and then I realized that there was contamination of iron inside the [inaudible 00:20:26].

Thomas Grimshaw: In the old batch.

Francesco Celani: [inaudible 00:20:26] batch.

Thomas Grimshaw: Yes.

Francesco Celani: [inaudible 00:20:26] and even inside, so I try to contact companies to make constantan [inaudible 00:20:26]. And they explain me it was very well I give the number, very old batch when I see I didn't [inaudible 00:20:27].

Thomas Grimshaw: Really?

Francesco Celani: Yeah, okay, but there, the time, the rules about the purity are very different from now. Now we have a better material, more pure, but I don't have one but I explain the rules before old 1%... iron is okay, no problem.

[inaudible 00:20:48] position [inaudible 00:20:50] just where the range of operation, proper [inaudible 00:20:57] so [inaudible 00:20:59] then I check analysis [inaudible 00:21:03] space but also inside but some [inaudible 00:21:08] of iron [inaudible 00:21:12].

Thomas Grimshaw: Interesting, so you think the older material worked because of the iron contamination perhaps?

Francesco Celani: [inaudible 00:21:24].

Thomas Grimshaw: Okay.

Francesco Celani: So later I would try to have iron in space, in the material, [inaudible 00:21:25] to have the fission, better fission but not so easy because I don't... [inaudible 00:21:44] so just [inaudible 00:21:44].

Anyway, with iron sometimes work, having iron, but [inaudible 00:21:52] was lower until again I move it to [inaudible 00:22:04] space having the materials and we move it to a complex geometry, like coaxial geometry, and making like electrolysis but [inaudible 00:22:23] electrolysis [inaudible 00:22:25] and use different principle and like [inaudible 00:22:33].

Thomas Grimshaw: Still with constantan, with nickel.

Francesco Celani: Yes, with constantan.

Thomas Grimshaw: And copper, okay.

Francesco Celani: Sometimes, but this space covered with other materials.

Thomas Grimshaw: Okay.

Francesco Celani: [inaudible 00:22:42].

Thomas Grimshaw: Plated.

Francesco Celani: Plated.

Thomas Grimshaw: Yes. Yeah.

Francesco Celani: [inaudible 00:22:42] material [inaudible 00:22:42] big experienced about. [inaudible 00:22:42].

Thomas Grimshaw: Yeah.

Francesco Celani: After we add some iron to the solution, [inaudible 00:22:42] and later again potassium permanganate, [inaudible 00:23:09] potassium alloy, [inaudible 00:23:16] to be more stable.... Sorry, [inaudible 00:23:23] potassium to be more stable so chemical effects on the [inaudible 00:23:23].

Thomas Grimshaw: Okay.

Francesco Celani: More or less the same, they said, yeah. And we move similarly about the [inaudible 00:23:36] until we use the [inaudible 00:23:39] to get the [inaudible 00:23:42] director and [inaudible 00:24:07] gas, and we work this way using parts.

Thomas Grimshaw: Okay.

Francesco Celani: But [inaudible 00:24:17] not good but easy to break a [inaudible 00:24:20] power now is [inaudible 00:24:25]. Anyway we... The most... The payback with more detail about our [inaudible 00:24:34] because showed during the last conference meeting when we stayed in China.

Thomas Grimshaw: Yes.

Francesco Celani: We wrote a very long paper, [inaudible 00:24:47] paper. Now it was a [inaudible 00:24:52] publication because [inaudible 00:24:55] paper [inaudible 00:24:59] page [inaudible 00:25:02] edition, 56 pages. If you write [inaudible 00:25:13] now [inaudible 00:25:19] accepted. And get

Rothwell... He's good with English, because Italian English is not good. I [inaudible 00:25:21].

Thomas Grimshaw: And who did the editing? You said it was Rothwell?

Francesco Celani: No, [inaudible 00:25:28].

Thomas Grimshaw: Oh, [inaudible 00:25:31]. Yeah. Very odd, yes. Okay, yes, his very good at that.

Francesco Celani: Yeah, [inaudible 00:25:38] these days [inaudible 00:25:43] read it, we can ask him to just read it, because last Sunday I give the paper in Belgium, and he told that Jacob need one week to make English edition. Like we did [inaudible 00:25:58].

Thomas Grimshaw: Okay.

Francesco Celani: All Italian, English... For English. [inaudible 00:26:04].

Thomas Grimshaw: Yeah.

Francesco Celani: I under it, I don't know.

Thomas Grimshaw: Well, we're at 26 minutes now, this will probably be another time for a break.

Francesco Celani: Yes.

Thomas Grimshaw: And then we'll pick up again with what you're looking up. So this is Tom Grimshaw, with Francesco Celani, we're talking about his cold fusion work here in Perscotti. It's September 23rd, 2022, so thank you Francesco and we'll pick it up in a future session.

## *A6. Sixth Segment*

Francesco Celani: You don't even get option.

Thomas Grimshaw: That's okay. So, this is Tom Grimshaw. I'm here with Francesco Celani. We're talking about his work in cold fusion, going back to the announcement on March 23rd, 1989. And Francesco, you started your work just a few days after that announcement. Today is September 23rd, and we're here in his laboratory in INFN in Froscatti. So with those introductory words, Francesco, I think when we ended our last session of this interview, you were talking about working with Constantin, copper, nickel alloy for use in setting up conditions for cold fusion, low energy nuclear reactions to occur. And I think, Francesco, you had gotten about to around 2016, or thereabouts. You and I first worked together in 2017 when you did your demonstration at NI Week, and then subsequently at ICCF. Well, at NI Week and then at ICCF-17, in Daejon, South Korea.

Francesco Celani: [inaudible 00:01:20] I was think with the [inaudible 00:01:28] in 2012, '11 or '12, in Austin.

Thomas Grimshaw: Yes.

Francesco Celani: Yes.

Thomas Grimshaw: Remind me the year, I may have the year wrong.

Francesco Celani: [inaudible 00:01:33]

Thomas Grimshaw: ICCF-17 might have been in 2013. It doesn't matter.

Francesco Celani: Okay [inaudible 00:01:43].

Thomas Grimshaw: It was in Daejon too. Yeah.

Francesco Celani: And that's from [inaudible 00:01:47].

Thomas Grimshaw: Yes, so pick it up there if you would, Francesco, with the work that you were doing with Constantin at that time, and you said that you have learned a great deal since then.

Francesco Celani: So, okay, the Constantin. I started working at the Constantin because just for a chance. I have a personal opinion about some accident that happened in one of the Andrea Rassi tester. Bright several reactors. And I think, just for my feeling-

Thomas Grimshaw: Yeah, and I should say Andrea Rassi for the transcriber. Thank you.

Francesco Celani: [inaudible 00:02:38], the reason of the [inaudible 00:02:38] HSE [inaudible 00:02:38] was not using [inaudible 00:02:50] is using, but just to take a thermometer, and J Type we used, J Type thermometer is Constantin [inaudible 00:02:59] together as iron. The Constantin is a alloy of the copper region. And this material is of a solution as per ability to dissociate the [inaudible 00:03:19] from molecular state to atom state, is almost the best materials user dissociate from the atom, before [inaudible 00:03:35] better than [inaudible 00:03:36].

But [inaudible 00:03:41] is over 1000 over the palladium. So if you want to go [inaudible 00:03:48] application. The core [inaudible 00:03:51] carrier is very important. And moreover, mechanically speaking, is more strong, maybe 4 times, 10 times of palladium at [inaudible 00:04:06]. So it's good [inaudible 00:04:11]. And then we want to try with a [inaudible 00:04:16], and [inaudible 00:04:16] was good. So we, we got a J Type wire for a thermometer [inaudible 00:04:28] open, make a wire, 30 meter long, and you just check inside of very simple glass rector. So the parameter, checking the water if there is some [inaudible 00:04:48] in some way, some [inaudible 00:04:51]. Yes, change the [inaudible 00:04:57].

So we make very, very preliminary basket experiments, and we found this. There was little [inaudible 00:05:06]. So, okay, this is a good start. But I able to use this, the space [inaudible 00:05:20] more [inaudible

00:05:20] space. So I [inaudible 00:05:22] Constantin is very stable. But [inaudible 00:05:28]. But later, in the documents on Isabelle [inaudible 00:05:34], that these one stories I could for the Constantin is very [inaudible 00:05:40]. And they were [inaudible 00:05:40] 600 degrees, 700 because you can damage the material. So working [inaudible 00:05:53] use oxidation. But oxidation [inaudible 00:06:02] your reduction, means increasing of surface to what it is working or looking for. So I decide to destroy the thermocouple to go to 700 degree, the least is [inaudible 00:06:15], you have the right color, so you can check [inaudible 00:06:17].

And I check it again this material, it's okay, same device. And I see a increasing rate of change equal resistance, just when we try some [inaudible 00:06:55] and about 1200 degrees [inaudible 00:06:55]. We had some decrease of temperature [inaudible 00:06:55] at 24, [inaudible 00:06:55] because it is a deeper indication. So we tried me to find wider [inaudible 00:07:00] because the temperature in the [inaudible 00:07:01] destroy the thermocouple. And I find a old [inaudible 00:07:10]-

Thomas Grimshaw: Or coil.

Francesco Celani: Yeah, like a coil that was in a old cabinet in iron, rustic. But [inaudible 00:07:31]. I say, "Okay, we don't use for a long time, for three years, I don't know." If you like [inaudible 00:07:35] what was [inaudible 00:07:38].

Thomas Grimshaw: That was that ENEA.

Francesco Celani: ENEA, yes, he was a friend there. I was going around to trying to Constantin, and saying, "Oh maybe if I showed the man [inaudible 00:07:51]."

Thomas Grimshaw: I remember 10 years ago.

Francesco Celani: Yeah, [inaudible 00:07:55] so please go there and he say, "Oh yeah." Okay, [inaudible 00:08:02], [inaudible 00:08:02]I found it one very, very kind is lecture, science. He know about me. And then he have good opinion about me.

Thomas Grimshaw: Okay, good. What was his name? If you can think of it.

Francesco Celani: Yes, but now he's very old, being 85. Now he's [inaudible 00:08:28].

Thomas Grimshaw: Okay.

Francesco Celani: I can have number, name the big [inaudible 00:08:33], it's something like that.

Thomas Grimshaw: That's okay.

Francesco Celani: But it's very, very [inaudible 00:08:39]. He works there at [inaudible 00:08:40] because he likes science. Until maybe five years before,

[inaudible 00:08:48] I was sick and then went from [inaudible 00:08:52]. Anyway, Very, very good, [inaudible 00:08:57]. I think it was [inaudible 00:09:00] good brain and give me lot of suggestions.

Thomas Grimshaw: Mm-hmm, and he gave you wire.

Francesco Celani: Yeah, a wire, it was little bit this big. Rusty, but okay, it's the only one I have. And I clean with the water and soap, and [inaudible 00:09:20] after [inaudible 00:09:21]-

Thomas Grimshaw: Yeah, it does, yeah.

Francesco Celani: ... to make it clean. And I test again, [inaudible 00:09:27] there is no [inaudible 00:09:28]. And the material beginning doesn't work as a regional [inaudible 00:09:38]. So we repeat the oxidation [inaudible 00:09:42], and it works better. And then I realize, "Okay, no difference between such material and modern thermocouple." So I try to use my procedure to add some [inaudible 00:10:03] to last long, and making reactor, make some control environment. I use [inaudible 00:10:13] wise, from a cold heater. So I give it the same power to both wise, and check for temperature if it's [inaudible 00:10:30]. And I found some difference.

Thomas Grimshaw: Good.

Francesco Celani: And then go on more or less faster. And big progress [inaudible 00:10:41] because I realize that, okay, you need creation, and I can use my old pulser [inaudible 00:10:47] to, some way, control the surface, and they give the pulse for what, I can remember the trials as a duration about 50 milli second, and reduce 0.1x, and I use a [inaudible 00:10:47] to pass the check. In [inaudible 00:10:47], the number of pass [inaudible 00:10:47] speeding of loading increase. So it means you have increased, and the [inaudible 00:10:47]could [inaudible 00:10:47] write down the pulse, and I think when I put the... I tried to increase before I make calibration. But helium, reference, nickel from one [inaudible 00:12:00]. But yeah, you have got some [inaudible 00:12:06].

That's the [inaudible 00:12:10] hydrogen, and I used the [inaudible 00:12:18] power in the [inaudible 00:12:18] in the [inaudible 00:12:20]. And I check raise temperature [inaudible 00:12:26]. And hydrogen when [inaudible 00:12:30]is that of the suction. So I'm like, "Okay, [inaudible 00:12:39] heating is not [inaudible 00:12:42]."

Thomas Grimshaw: We're taking a slight break here for equipment adjustment.

Francesco Celani: Easy to break, so better, because I touch it. So better to... Safety.

Thomas Grimshaw: All right, good. Yeah, little equipment adjustment there.

Francesco Celani: Okay, and I seen that even in that heating means absorption, then some heat was [inaudible 00:13:24], it was [inaudible 00:13:27] in the perception. [inaudible 00:13:30] 300 to 400 [inaudible 00:13:35]. Not

| | |
|---|---|
| | [inaudible 00:13:37]. So I knew the power from the resident [inaudible 00:13:44] for [inaudible 00:13:46], and that was nickel. So I say, "Okay, [inaudible 00:13:55] take some [inaudible 00:13:57]." and I work until the wide break. |
| Thomas Grimshaw: | Okay. |
| Francesco Celani: | And then [inaudible 00:14:06]. And in the next [inaudible 00:14:11] study after I spoke to my friends. What we have found until such information arrived even to national [inaudible 00:14:22] boss. James Truchard. |
| Thomas Grimshaw: | Yes, James Truchard. |
| Francesco Celani: | James, yeah, thank you. My memory is always [inaudible 00:14:43]. |
| Thomas Grimshaw: | Yes, it's okay. And Stephan Concezi. |
| Francesco Celani: | Stepheno [inaudible 00:14:53], he's a Italian [inaudible 00:14:53]. He was there for some other reason. "Can I visit,?" "Okay, no problem." He was interested and convinced me to drink my [inaudible 00:14:53] rice from the United States- |
| Thomas Grimshaw: | Yes. |
| Francesco Celani: | ... for measuring [inaudible 00:14:53]. |
| Thomas Grimshaw: | Yes. That was in August. |
| Francesco Celani: | Yeah, [inaudible 00:14:57]. |
| Thomas Grimshaw: | Yeah. I think it was August, but I'm trying to remember the year. Oh, we'll have to look at it. |
| Francesco Celani: | It was [inaudible 00:15:23]. |
| Thomas Grimshaw: | I think 2013. |
| Francesco Celani: | No, before [inaudible 00:15:23]. More or less. And then in- |
| Thomas Grimshaw: | 2012. |
| Francesco Celani: | ... this material works. I didn't say why. I was gassed from [inaudible 00:15:39]. I got people join like Thomas. |
| Thomas Grimshaw: | Yeah, you're talking about Dennis Sless, I think. |
| Francesco Celani: | Dennis, [inaudible 00:15:41]. |
| Thomas Grimshaw: | Dennis Sless helped to assemble it, and Brian Glass was involved. |
| Francesco Celani: | Brian Glass, several people all were very, very kind to me. |
| Thomas Grimshaw: | Yes. |
| Francesco Celani: | And we reassemble the reactor. We had some accident during the assembling, some noise coming inside the rector. Anyway, expand, it drops again, [inaudible 00:15:59]. And since the demonstration during |

any week was not successful, and after came back [inaudible 00:16:16], and several people asked me otherwise, and I did for me some and other [inaudible 00:16:24] to other people, [inaudible 00:16:25] yes, for kindness. But that's the [inaudible 00:16:35] really. And more than batch of why the people that's in other place, more clean place.

Thomas Grimshaw: Yeah, I should interrupt at this point and say that, immediately after your demonstration at IN Week in Austin, you transported the equipment and Brian Glass to ICCF-17 in Daejeon.

Francesco Celani: Yes, in Korea.

Thomas Grimshaw: In Daejeon, Korea. And then you returned to Italy-

Francesco Celani: Again, Again, works like nothing got broken. So I was lucky.

Thomas Grimshaw: Yeah. so Brian Glass came to Italy and to your laboratory for two weeks.

Francesco Celani: Yes. He was really very kind people, [inaudible 00:17:25] to people.

Thomas Grimshaw: Yes.

Francesco Celani: So it's important.

Thomas Grimshaw: Good.

Francesco Celani: [inaudible 00:17:36] and really good people. For me, it was a wonderful [inaudible 00:17:36] of them.

Thomas Grimshaw: Okay. And I gave you the report that I prepared.

Francesco Celani: Yeah, very kind of you. I never seen before, but that's okay.

Thomas Grimshaw: Yeah, because it was just for National Instruments at that time.

Francesco Celani: Internally.

Thomas Grimshaw: But that time is passed now, so you can see if I did a good job.

Francesco Celani: Okay cool. And that's where I share the material everywhere. The people at the beginning with no [inaudible 00:18:28] to manage. So there was some breaking the wire, easy to break. And finish all this batch. And the second batch worked better, no fuel, but with long about trying to digest the [inaudible 00:18:31] more. And we were able to [inaudible 00:18:33]. But with more difficulty, take batch more than I bought fresh from [inaudible 00:18:37], that worked.

Thomas Grimshaw: Okay, yeah, so typical.

Francesco Celani: Very typical. Why and after we realize can be one reason is the [inaudible 00:18:50]. Both this phase of the wires because rust, one cause the composition of the [inaudible 00:19:03] was different because before mostly through [inaudible 00:19:08] a contaminant. Before they add 1%, it's okay. With the new rules, up to 0.1%.

Thomas Grimshaw: That's a big change, tightening of standards of iron content, yes.

Francesco Celani: And other people do but at the lower level. So I realize that the iron can have a role, I try to have iron [inaudible 00:19:37], not so easy, but sometimes I realize, so some wires, but it doesn't work [inaudible 00:19:49] adding from my own thinking, improve companies iron make [inaudible 00:19:55]. So just to try and we make several steps. We realize that the [inaudible 00:20:19] is very important. And moreover, not only [inaudible 00:20:19], but [inaudible 00:20:19], it means flex. And so we develop a special geometry called the cap machine knot. That is a large temperature gradient [inaudible 00:20:26]. It works even low quality, it means more than [inaudible 00:20:33] works-

Thomas Grimshaw: Good.

Francesco Celani: ... almost always, but easy to break. Anyway, giving me spirits to complete it.

Thomas Grimshaw: More motivation to continue.

Francesco Celani: Yes, more motivation. [inaudible 00:20:58] maybe even in internet, there is a cap machine knots out there, maybe you can in the internet, cap machine knots how [inaudible 00:21:07], the [inaudible 00:21:09].

Thomas Grimshaw: I remember only that you used knots, but I did not know why.

Francesco Celani: Yeah, [inaudible 00:21:35], cap machine knots. It was big progress because over a mile gradient of about 200 degree in one limited distance. So it means [inaudible 00:21:35] gradient flex dependents in 10 people. It's supposed to be [inaudible 00:21:39]. But several time you went out of control, so [inaudible 00:21:39] the way is flex. The [inaudible 00:21:39] of all what we have decided [inaudible 00:21:39] to begin with. You need to [inaudible 00:21:39], okay, you found something.

Pietro: [inaudible 00:22:07]

Francesco Celani: Okay. [inaudible 00:22:11].

Thomas Grimshaw: So we're looking at the Cap machine knot-

Francesco Celani: Cap machine knot.

Thomas Grimshaw: ... in the Constantin wire.

Francesco Celani: Yes.

Pietro: [Foreign Language 00:22:25]

Francesco Celani: Preparation of cap machine knot.

Thomas Grimshaw: Okay.

Francesco Celani: There is [inaudible 00:22:29].

Thomas Grimshaw: Very nice video of the-

Francesco Celani: Some are even better.

| | |
|---|---|
| Speaker 4: | Six, seven- |
| Thomas Grimshaw: | And that is you carefully winding the wire around the- |
| Francesco Celani: | And this is a [Foreign Language 00:22:48] no cap machine knot [Foreign Language 00:22:52]. |
| Pietro: | [inaudible 00:22:52] |
| Francesco Celani: | No cap machine knot [Foreign Language 00:22:52]. |
| Pietro: | [Foreign Language 00:22:54] cap machine. |
| Francesco Celani: | Normally [inaudible 00:22:56]. |
| Pietro: | [Foreign Language 00:22:57]. |
| Speaker 4: | [Foreign Language 00:23:04] |
| Thomas Grimshaw: | Very clear video. |
| Francesco Celani: | [Foreign Language 00:23:24] |
| Pietro: | [Foreign Language 00:23:24] |
| Francesco Celani: | [Foreign Language 00:23:24] |
| Pietro: | [Foreign Language 00:23:24]. |
| Thomas Grimshaw: | Oh okay, so once it's wrapped around, then you- |
| Speaker 4: | [Foreign Language 00:23:56] |
| Thomas Grimshaw: | I'm going to put the recording on pause for a moment while this is going. So I'm resuming the tape now. That was a very nice video demonstration of tying a cap machine knot. Thank you, Pietro. |
| Francesco Celani: | Yes. |
| Pietro: | You're welcome. |
| Francesco Celani: | [inaudible 00:24:18] cap machine [inaudible 00:24:20] to make [inaudible 00:24:21], one make it the size. |
| Thomas Grimshaw: | But to review is to enhance flux in the wire, to get more [inaudible 00:24:32]. |
| Francesco Celani: | Yeah, because it depend on the [inaudible 00:24:36]. There is a feature in my previous obligation where is shown [inaudible 00:24:44] the gradients in cap machine knot in millimeter, more than 130 degree. Red color, black color. Very, very close. So this is a thermal [inaudible 00:24:59], so thermal flats for [inaudible 00:25:02], full panels, no energy added. The point is material easy the to break. |
| Thomas Grimshaw: | Mm-hmm, brittle. |
| Francesco Celani: | Yes. But when it doesn't break, it is very good results. |

Thomas Grimshaw: Mm-hmm. Another one of those cases of whether to have something that works and breaks-

Francesco Celani: [inaudible 00:25:32]

Thomas Grimshaw: Good.

Francesco Celani: We have to find some mechanical way, some [inaudible 00:25:43] is valid.

Thomas Grimshaw: Is valid, okay. Very good.

Francesco Celani: [inaudible 00:25:48]

Thomas Grimshaw: So that was the work you did after the demonstration with the reactor at NI Week.

Francesco Celani: Yes. because we want to make something ready for people. Depends on the material quality. Do you need some stronger parameter.

Thomas Grimshaw: Okay. So I think we should end this one and I'd like to have a quick one to talk about your current work and your current reactor. So let's stand by on that. I'll start a new recording for that. And then somehow, I would like to have sometime to talk about your background before cold fusion, where were you born, I know in Rome, and that sort of information. So let me stop this one. And we'll start the one on the current experiment, and then we'll do the background. So this is Tom Grimshaw with Francesco Celani on September 23rd in his lab at INFN. And we're going take a break. Thank you again, Francesco.