PROPOSAL FOR A SOLID STATE ENERGY TECHNOLOGY LABORATORY

LOS ALAMOS AND SANTA FE, NEW MEXICO

Volume 1: Proposal

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Outside View of Dr. Thomas Claytor's Lab in White Rock, NM

Contents

Executive Summary

As a result of the accomplishments of two premier LENR researchers in achieving experimental success and theory development, the time has come for a new dedicated LENR research laboratory. The new organization, the Solid State Energy Technology (SSET) Laboratory, is being set up in northern New Mexico by these researchers with the support of an experienced organization and project manager. The fundamental philosophy of the organization is that a solid foundation of theoretical understanding is essential for development of commercial LENR-based energy production devices.

Funding for the SSET Lab will be through private investment, with return on investment being generated through lease or sale of intellectual property or by income from companies created as spinoffs for production of LENR energy devices. The lab originators are Drs. Edmund Storms, Tom Claytor, and Tom Grimshaw, who will have primary responsibility, respectively, for theory development, experimental direction, and organization development. Ed Storms and Tom Claytor are retired from the Los Alamos National Laboratory (LANL), where they worked successfully in the LENR field before retiring. Tom Grimshaw has been working on LENR public policy for several years at The University of Texas at Austin.

The research strategy is to build upon experimental successes by Claytor and Storms with an advanced LENR explanation by Storms, which is an outgrowth of a new book that he is currently finalizing. Substantial laboratory and equipment assets in Claytor's and Storms' existing research operations are being deployed for the SSET Lab, including Claytor's 2300-square-foot lab in White Rock, near Los Alamos. The Lab is being developed in stages, with initial operations at Claytor's lab and subsequent experiments at a new facility in Santa Fe.

The vision of the SSET Lab includes educational support for students interested in LENR and training for professionals in key fields for LENR understanding, such as materials science and nanotechnology. Established contacts at LANL and Sandia National laboratory will help ensure access to advanced experimental equipment for state-of-the-art LENR research. The northern New Mexico location of the SSET Lab presents several major advantages, including the availability of a highly-trained pool of scientists and engineers in relevant disciplines (e.g., staff and retirees at the national labs) and the national reputation of the area as a desirable place to live.

Many advances have taken place in the LENR field since its 1989 announcement. The SSET Lab represents a major step forward in the realization of the potential of LENR as a cheap, clean, and virtually unlimited source of energy that can meet worldwide demand for the foreseeable future.

1 Introduction

Cold fusion (now commonly referred to as low energy nuclear reactions, LENR) has potential for enormous benefit as a clean, cheap, and virtually unlimited supply of energy. Since it was rejected by mainstream science within a year after it was announced in1989, LENR has been investigated by many competent researchers. The level of evidence that LENR is a real phenomenon has risen dramatically in recent years, and so has the probability that its benefits will be realized.

Two main issues stand in the way of LENR realization – lack of an adequate explanation and insufficiently reliable reproducibility. A number of devices have been proposed or developed for energy production based on LENR. However, these devices are severely limited for successful commercialization by the continued lack of sufficient theoretical basis for the phenomenon. The laboratory proposed here, the Solid State Energy Technology (SSET) Laboratory, is specifically designed to first understand the scientific basis of LENR and then undertake engineering and development for producing useful energy production devices.

The SSET Lab will not only conduct research based on the current best LENR thinking, but also provide education and training to help assure continued advances of the field. The lab is being promoted for a northern New Mexico location by prominent and highly respected researchers who have not only achieved consistent LENR reproducibility but have also developed a promising theory for basic understanding of the phenomenon.

2 The Case for the Solid State Energy Technology Laboratory

LENR requires only knowledge about the process for it to be implemented quickly and on a world-wide scale. Large, complicated installations are not required to produce the energy. Generators from a scale suitable to power devices ranging from cell phones to aircraft carriers may be expected. LENR has been studied in depth by many researchers at a number of labs in several countries. Particularly in the last few years, the state of knowledge and body of experimental evidence have increased – the landscape has changed dramatically for LENR.

However, problems remain. No consistently performing device has yet appeared, and commercial success remains elusive. Although several successful efforts at making commercial level energy have apparently been empirically demonstrated, the underlying science is not well understood, and the methods involved have not been revealed.

LENR produces energy by nuclear fusion using isotopes of hydrogen and unique materials. The method continues to be unreliable because the critical variables controlling the process have not been identified, the nature of the unique material has not been sufficiently characterized, and the nuclear mechanism is not yet fully understood. A different approach to achieve understanding from the one normally used is required for LENR because the phenomenon involves a nuclear process being initiated in a novel chemical environment on a nanoscale.

Although many examples exist in the history of technology where commercial development has preceded complete scientific understanding, such cases normally result in research to understand and optimize the technology. Because of LENR's challenges for consistent reproducibility, this model appears unlikely to apply. Understanding will need to precede development and commercialization.

The SSET Laboratory is designed to achieve fundamental understanding of LENR and then develop and commercialize the resulting energy technology. Additional information on the case for the Laboratory is provided in Appendix A.

3 Business Model

The laboratory Originators believe that the path to LENR understanding will be based on its potential for commercial success. Private investment for support of the needed research will result in intellectual property that can, in turn, lead to development of LENR-based energy production devices. The overall concept is to develop the scientific foundations of LENR in advance of attempting to engineer commercial devices on an empirical basis.

The SSET Lab is being structured to generate income from sale or lease of patents and from spin-off companies formed to apply the designs to particular applications. These companies will receive the benefit of training provided by SSET Lab staff. Rather than starting with a design for

an energy generator, the proposed laboratory starts with discovery, which is then applied to produce the best design. The resulting intellectual property will be unique and worthy of receiving patent protection.

A portion of the research results may go into the public domain, mostly as peer-reviewed publications. However, the research findings that have potential to help achieve LENR commercialization will remain proprietary and will be developed into patent applications to ensure that intellectual property is protected.

The situation regarding patents for LENR is very unusual because the US Patent and Trademark office is reluctant to grant patents for claims based on energy production from LENR. Consequently, such claims either need to be hidden in a patent claiming something else or the patent must describe only a limited but essential aspect of the process that does not make such a claim. Many of the granted parents only describe a recipe for producing energy without a description that would allow replication by a person skilled in the art or any useful insight about how the recipe applies. Consequently, the effect is presently poorly covered by patents, which allows room for controlling patents to be submitted once the effect is fully understood.

4 Credentials of Lab Originators

The SSET Laboratory is being developed by two of the foremost researchers in the LENR field in concert with a highly experienced organization manager who is also working on public policies toward LENR development.

Dr. Ed Storms is widely regarded as one of the foremost LENR researchers in the world. Not only has he conducted numerous successful experiments in his private lab in Santa Fe, he has also prepared more than 100 LENR papers for peer-reviewed publication and other venues. His LENR book[1] is widely accepted as the most authoritative LENR reference currently available. Dr. Storms began his

[1] Storms, Edmund, *The science of low energy nuclear reaction*. 2007, Singapore: World Scientific. 312 p.

LENR research in the latter stages of his 34-your career at LANL and has continued his private lab experiments for the last 20 years.

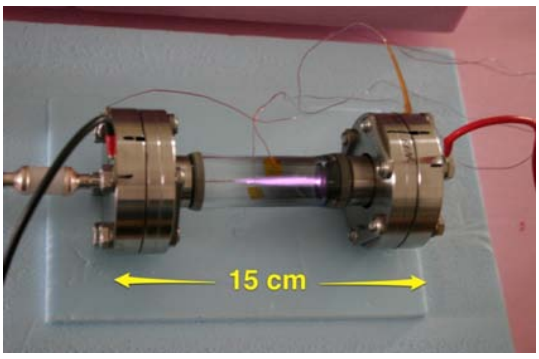
Dr. Tom Claytor had a successful career at Argonne National Laboratory and LANL for 34 years before retiring to devote full time to LENR research. While at LANL, he led the LENR research effort for 22 years. Since he began working in his private lab, he has achieved LENR success using the gas discharge method with tritium production as the primary signature as well as other methods. Dr. Claytor's facility will host the SSET Lab during the first phase of its operation.

Dr. Tom Grimshaw has been researching the public policy aspects of LENR for the past several years. His studies have included policies both for public support of LENR R&D and for dealing with the disruptive impacts of LENR when it is widely deployed as a major new source of energy. Before changing careers to energy policy development, Dr. Grimshaw had a long career in environmental protection and cleanup. During this career, he held a large number of highly varied and successful management positions, both for organizations and individual projects.

Complete resumes of the SSET Lab originators are provided in Appendix B, and lists of publications are in Appendix C.

5 Research Strategy

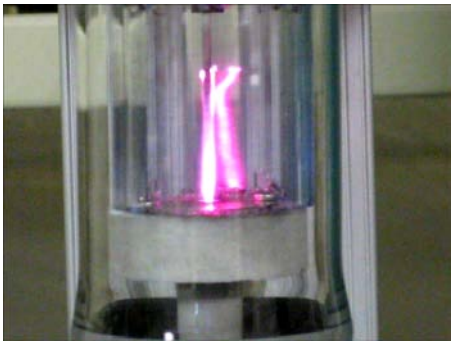
The SSET Lab research program is being prepared based on the current best thinking in the field and on demonstrated LENR success. Dr. Claytor has consistently achieved LENR in his private lab in White Rock and previously in his position at Los Alamos National Laboratory. Dr. Storms has also had LENR success in his 20 years of research in his lab in Santa Fe, and he has been a pioneer in developing a theoretical explanation for the



Claytor Achieves LENR with Gas Discharge Experimental Cells

phenomenon. As noted, he "wrote the book" on LENR, and he is currently putting the finishing touches on an extensive update. The update includes a complete review of LENR reports as well as a detailed explanation of his new theory, which is based on "nuclear active environments" on and near the surface of LENR-active materials.

The strategy of research at the SSET Lab is therefore to build on Claytor's and Storms' previous LENR success in combination with guidance from Storms' new book. The initial focus will be on evaluating and refining Claytor's LENR methods for investigating the phenomenon based on Storms' concepts. Experiments will then be performed to verify the theory and develop the data for the next step, which will involve determination of variables and conditions required for production of useful energy from LENR.



Gas Discharge Modes of Operation: Ion Channel and Attachment

The major components of the research strategy may be summarized as follows.

Gas Discharge Methods for Guiding Investigations of Nanocrack Functions in LENR Phenomena. The presently successful gas discharge method developed by Dr. Claytor provides a window into understanding how the nuclear process operates. Measurement of the nuclear products, consisting of helium, tritium, radiation and energy, allows the mechanism to be understood. However, this information does not reveal the conditions required for the nuclear reaction to occur or the rare location in the material where the nuclear reactions take place.

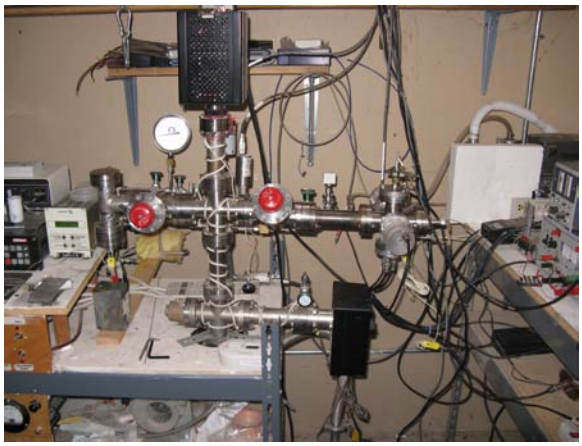
Investigation of the Role of Stress-Induced Nanocracks in Achieving LENR in Solid Materials. An extensive study of the literature has suggested the location and conditions required for the nuclear reaction to occur. The present belief is that stress induced cracks of a critical size are required. These cracks are produced by random processes in certain materials when stress is created by various chemical processes. The process of their creation will be determined by applying conventional material science. The cracks will be identified using high-resolution SEM and TEM methods.

Determination of Methods for Creating Nanogaps for Consistent LENR Energy Production. If gaps of a critical dimension are required, these can be created using nano-machining to achieve large numbers of active sites in a material with total reproducibility and at low cost. This method will be explored once access to the required tools has been obtained. After the technique for producing artificial nanogaps having the optimal LENR inducing properties has been refined, nanogap production methods will be developed for the commercial application of LENR-based energy.

A draft research plan that provides additional detail is in preparation and will be revised and amplified as needed when SSET Lab funding has been secured.

6 Current Labs and Assets

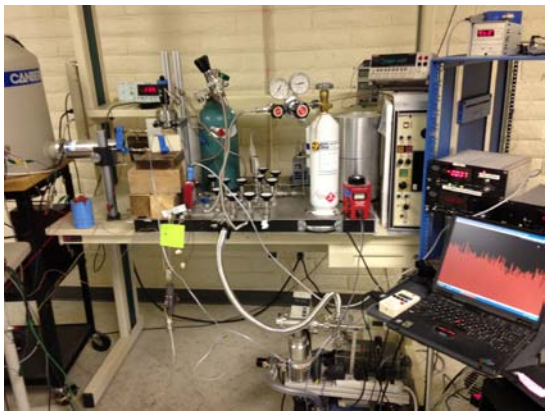
The SFLL is being built on a solid foundation of success in laboratory investigations and theory development. Both Claytor and Storms have substantial experimental equipment in their current labs. Examples of these assets in Storms' lab are a sophisticated setup for gas loading, gas discharge, electrolytic cell, and other LENR methods and an electron microscope with energy dispersive X-ray spectroscopy (EDS) added. Storms' personal LENR library is the most extensive in the field, with over 4600 items, all of which are fully indexed and most with complete copies on hand.



LENR Experimental Setup in Dr. Storms Lab

Claytor's lab includes three areas for gas discharge and other LENR methods, a shop, three offices, a sizable conference room, and full utilities for up to five staff.

Additional detail on existing labs and LENR equipment is provided in Appendix D, along with additional photos of the laboratories.



Experimental Setup in Dr. Claytor's Lab in White Rock, NM

Shop Area in Dr Claytor's Lab

7 Development Plan and Lab Management

The SSET Lab is being organized and managed in accordance with established laboratory procedures and staff management principles. The originators will have overall Lab responsibility, with Storms and Claytor providing leadership, respectively, in theory development and performance of experiments. Grimshaw will have overall responsibility for Lab management and development, starting with a draft operations plan.

The SSET laboratory is being developed in two stages. The first stage will include research of high-priority topics and preparation for the second stage. The second stage will expand the research based on what is discovered during the first stage. Both stages will take advantage of, and build upon, ongoing research efforts and existing laboratories of Storms and Claytor. The first stage will take place in Claytor's existing lab in Los Alamos, and the second stage is anticipated to be in a new facility in Santa Fe. A multidisciplinary staff of physicists, chemists, materials scientists, and professionals with experience in nanotechnology will work in teams to enhance communication and understanding of LENR from several technical perspectives.

The SSET Lab originators are highly experienced and have worked for many years in their professional fields. It is recognized that ongoing operation of the SSET Lab will depend on hiring managers and staff who will be the recipients of the organization's knowledge and LENR capability of the originators. A Lab Director will be hired during the initial phases of operation. He or she will finalize and implement the research and operations plans. With the support and concurrence of the originators, he or she will also hire Lab staff as the needs arise and funding permits. The Director will have responsibility for establishing collaboration with individual LENR researchers working at other locations including national laboratories, university researchers, and educators.

8 National Laboratory Collaboration

The US DOE National Laboratories at Los Alamos and Albuquerque (Sandia Labs) are top energy research labs in the nation. Both labs have sophisticated instruments and other assets that are critical for advanced LENR investigations.

An arrangement between the state of New Mexico and the labs makes these facilities easily available to small businesses like the SFLL. Both Claytor and Storms have extensive contacts and working relationships with staff at LANL and Sandia, which will facilitate SFLL collaboration and enhance availability of these facilities.

9 Education, Training, and Researcher Coordination

Support for the education of young scientists is essential to the vitality of the LENR field and is a central component of the SSET Laboratory mission. In addition, an educated workforce will be required to develop, manufacture, and service the LENR energy generators when they have been developed. The unique knowledge of the founders will be made known to the SSET Lab investigators who will carry this technology into the future. This education can best take place through close interactions between the founders and the investigators. Scholarships will also be created at universities such as the University of New Mexico to support students interested in studying LENR. This relationship may also include a regular lecture series to educate the students, staff, and community about LENR.

Because LENR research is a highly inter-disciplinary effort, training of experts in collateral fields, such as nanotechnology and materials science, is also a key element of the Laboratory paradigm. The LENR phenomenon is being studied in the US at about a dozen locations, most without collaboration or access to proper tools and funding. These independent efforts can be made much more efficient by providing a central source of knowledge, funding, and access to the required tools.

The SSET Lab will collaborate with other laboratories that are willing to share information and access to equipment for the purpose of advancing understanding of the effect and development of the technology. Laboratories will be included in the collaboration when they offer benefits to the LENR field and to the SSET Lab.

10 Los Alamos and Santa Fe Advantages

Los Alamos and Santa Fe are ideal choices for the SSET Lab because the area has a large population of scientifically trained workers as a result of the two national laboratories – LANL in Los Alamos and Sandia National Laboratories in Albuquerque. Working professionals and highly qualified retirees from the national labs may become interested in working at the SSET Lab.

Santa Fe, in particular, is considered a very desirable city that attracts the rich and famous as well as many tourists. Access to other parts of the world is available using the airport in Santa Fe or the international airport in Albuquerque. Driving time between Santa Fe and Los Alamos is about 40 minutes, which is a commute taken by many people living in Santa Fe and working in Los Alamos. About 60 minutes are required to reach the airport in Albuquerque from Santa Fe.

11 Funding

Initial funding for SSET Laboratory will be for a minimum six-year period, one year for the initial stage and five years for subsequent operational stages. The level of required funding will depend on the number of projects and experiments that are conducted. A minimum of $250,000 is required for setup during the first few months of the initial stage, with an amount of $2,000,000 being the ideal and most effective level of initial funding for the first year. Subsequent funding will require a minimum of $5,000,000 per year that is committed each year for two years and $10,000,000 per year committed for three years. This investment is expected to be returned at the end of five years, with additional return being provided during subsequent years as the LENR technology is developed. Additional funding may be needed to create

companies for the purpose of engineering development and the manufacture of operating LENR energy generators.

Appendices

The following appendices may be found in a separate Volume 2, which has been prepared for those who are interested in more detail on the proposed SSET Lab.

A. Requirement for SSET Laboratory

B. Resumes of Lab Originators

C. Publication Lists

D. Claytor and Storms LENR Laboratories

Additional Information

Additional information about the SSET organization, goals and methods is available upon request.

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