

DOE SBIR and STTR FISCAL YEAR 2009 PHASE II GRANT APPLICATION AWARDS BY STATE

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ALABAMA

Company	Title
Plasma Processes, Inc. 4914 Moores Mill Huntsville, AL 35811	Electrochemical Microalloying of Tungsten for Plasma Facing Component Applications
Summary	
Development of tungsten alloys with improved properties will allow the fabrication of robust fusion components; thus bringing fusion's promise of efficient electrical power generation, a step closer to being realized.	

Company	Title
Polaris Sensor Technologies, Inc. 200 Westside Square Suite 320 Huntsville, AL 35801	Polarimetry in Remote Sensing Applications to Enhance Signal-to-Noise Ratios, Man-made Object to Natural Background Material Contracts, and Provide Increased Image Stability in the Infrared Region
Summary	
This project will develop an innovative infrared imaging system that forms images of infrared scenes using polarized light. Elements of the image that are not visible using un-polarized light are made visible and information about orientation of surfaces and objects can be obtained thereby enhancing the detection of objects of interest.	

ARKANSAS

STTR Project	
Company	Title
Arkansas Power Electronics International, Inc. 535 W. Research Boulevard Suite 209 Fayetteville, AR 72701-6959	SiC-Based Solid-State Fault Current Control System for Vulnerability Reduction of Power Distribution Networks
Summary	
This project seeks to develop high-voltage, high-performance Solid-State Fault Current Controller (SSFCC) technology utilizing Silicon Carbide (SiC) super gate-turnoff thyristors (SGTOs). This technology will provide unprecedented fault protection capability greatly minimizing the recovery time and vulnerability of the network in the event of a large-scale natural disaster.	

ARIZONA

Company	Title
MER Corporation (Materials and Electrochemical Research) 7960 South Kolb Road Tucson, AZ 85756-9237	An Innovative Triple Function Cathode for MEMS Fuel Cells
Summary	
This project will use a single material for use in miniature electric power sources that replaces three materials used in conventional fuel cells thus simplifying their assembly and reducing their cost. This improved miniature fuel cell system provides more power for longer to portable electronics while reducing the quantity of toxic battery materials.	

Company	Title
MER Corporation (Materials and Electrochemical Research) 7960 South Kolb Road Tucson, AZ 85756-9237	Lightweight Metal Foams with Tailorable Structure and Properties

Summary

A low cost technology for metal foams with a uniform, consistent, and well-controlled cell structure and properties will be developed. New opportunities will be opened for production of lightweight energy absorbing vehicle components, which enable enhanced safety as well as weight and cost savings.

Company

Advalue Photonics Inc.
4585 S. Palo Verde Road
Suite 405
Tucson , AZ 85714
AZ 85714-1962

Title

High Efficiency Fiber Laser for Advanced Accelerator

Summary

Department of Energy needs single polarization mode-locked high power 2 micron fiber laser for advanced laser electron accelerator. This project is for the development of a new fiber laser by using innovative specialty fiber to meet Department of Energy's demand. This fiber laser can also be used for materials process, remote sensing, and bio-medical applications.

STTR Project**Company**

Burge Environmental, Inc.
6100 South Maple Avenue
Suite 114
Tempe, AZ 85283-2872

Title

In-Situ Monitoring of Uranium in Ground Water Using a Colorimetric-Based Sensor: Enabling the Mapping of Uranium Plume Migration of Contaminated DOE Sites

Summary

A field-deployable monitoring system for the cost-effective and rapid determination of radioactive substances in the groundwater at federal sites, such as Hanford Site, Washington, will be developed. The development of the system will decrease the future cost of site remediation.

CALIFORNIA**Company**

Transition45 Technologies, Inc.
1963 North Main Street
Orange, CA 92865-4101

Title

Advanced Nb-based Intermetallics for Nuclear Applications

Summary

Niobium-based intermetallics are innovative advances materials that are among the closest to replacing superalloys in very high temperature applications. The successful development and implementation of these alloys may revolutionize technology by allowing for much higher temperature operating conditions for nuclear systems as well as industrial gas turbines and aircraft engines.

Company

Hi-z Technology Inc.
7606 Miramar Road
Suite 7400
San Diego, CA 92126-4210

Title

Study of the Use of Quantum Well Thermoelectrics for Truck Air Conditioning

Summary

This project will develop a solid state cooling device which is free of environmentally harmful refrigerant gases and powered by truck exhaust. Phase I of the program demonstrated through a working model that solid state Thermoelectric could be used in a cooling system to cool truck cabs.

Company

Los Gatos Research
67 East Evelyn Avenue
Suite 3
Mountain View, CA 94041-1529

Title

Field-Deployable Water Isotope Analyzer for Stream Sampling

Summary

This project will develop a field-deployable analyzer to continuously monitor water sources and help provide information about the storage, flow pathways, and sources of water. Such measurements are critical to DOE's waste remediation efforts.

Company

Physical Optics Corporation
20600 Gramercy Place, Bldg. 100
Torrance, CA 90501-1821

Title

Wind Resource Assessment Lidar

Summary

The proposed technology provides a cost-effective tool to accurately and efficiently evaluate wind resource conditions at potential sites for future wind farms, enabled by rapid deployment and autonomous operational capabilities.

Company

Acree Technologies Incorporated
1900 Olivia Road
Unit D
Concord, CA 94520

Title

Advanced Coatings to Improve the Efficiency, Color Rendering and Life of High Intensity Discharge Lamps

Summary

This project will lead to a more efficient light that will save the United States over 40 TWh of energy per year. This will help reduce the United States' dependence on foreign energy sources and help achieve the DOE goal of developing energy efficient, high-quality lighting technologies by 2025 that can illuminate buildings using 50% less electricity compared to 2005 technologies.

Company

Luminit, LLC

1850 W. 205 Street
Torrance, CA 90501-1526

Title

Multifunctional UV Curable Sol-Gel Organic Hybrid Nanocomposite Encapsulation System

Summary

To meet DOE SAI goals, a protective encapsulant is being developed to increase the efficiency and lifetime of solar cells/modules by providing an oxygen and moisture barrier with super hydrophobic and anti-reflection properties. By mass producing this encapsulant roll-to-roll, the cost of solar cells can be reduced by 50%.

Company

Altex Technologies Corporation
244 Sobrante Way
Sunnyvale, CA 94086-4807

Title

Biomass Blending Densification System (BBADS)

Summary

Biofuels plant production is constrained by the high cost of moving agricultural residues from the farm to a central processing plant. The development of the proposed biomass densification and energy enhancement system will reduce feedstock costs, rendering biofuels plants more competitive with fossil fuels.

Company

Ultramet
12173 Montague Street
Pacoima, CA 91331-2210

Title

Innovative Surfaces for Controlled Flow of Molten Lithium

Summary

Fusion energy is an ideal alternative to fossil fuel energy, providing a greater quantity of environmentally friendly energy than wind, solar, and geothermal sources. Practical application of fusion requires the development of materials and structures that allow operation under the high temperature, high heat flux conditions necessary for cost-competitive energy generation.

Company	Title
Far-tech, Inc. 3550 General Atomics Ct Building 15 Suite 155 San Diego, CA 92121-1122	A Toolset for Kalman Filter Resistive-Wall-Mode Feedback Modeling Including Plasma Rotation
Summary	
The accurate, real-time identification and feedback control of unstable modes is essential for the success of advanced fusion reactors, and the development of these controls will speed the commercialization of efficient, clean fusion power. The proposed feedback tool will provide a key solution for an enhanced detection and feedback control of the instability.	

Company	Title
Far-tech, Inc. 3550 General Atomics Ct Building 15 Suite 155 San Diego, CA 92121-1122	Hyper-Velocity High-Density C60-Fullerene Plasma Jet for Disruption Mitigation
Summary	
Plasma jets have many important applications in magnetic fusion energy research. A reliable tool with real-time capability to solve the critical problem of disruption mitigation on future fusion reactors such as ITER will provide also a significant enhancement to other fusion and high energy density physics projects.	

Company	Title
Xia, LLC 31057 Genstar Road Hayward, CA 94544-7831	High-Speed, Multi-Channel Detector Readout Electronics for Fast Radiation Detectors
Summary	
This project will develop high speed digital detector readout electronics that will help scientists to more precisely measure nuclear properties and thus better understand fundamental physics. It can also improve the performance of fast radiation detectors used in homeland security applications and other applications requiring precise timing.	

Company	Title
Alameda Applied Sciences Corporation 3077 Teagarden St San Leandro, CA 94577-5720	Low Temperature Deposition and RF Analysis of Nb ₃ Sn, an A-15 Superconductor for SRF
Summary	
The proposed effort will continue to explore whether superconducting Niobium (Nb) and Triniobium Tin (Nb ₃ Sn) thin films produced by cathodic arc deposition are useful in Superconducting Radio Frequency accelerator cavities. If these thin-films on Cu or Al eventually replace bulk Nb that could reduce the operating costs of future particle accelerators significantly.	

Company	Title
Nonlinear Ion Dynamics, LLC 13704 Saticoy Street Panorama City, CA 91402	Integrated Spin System for Production of Large Quantities of Stable Isotopes
Summary	
There is an enormous unmet demand of stable isotopes as a result of limitation of existing technologies and lack of domestic supply. A patented evolutionary technology is proposed for separating large quantities of stable isotopes in metallic and gaseous forms efficiently and economically through joint funding by government and private sources.	

Company	Title
Duly Research Inc. 1912 MacArthur Street Rancho Palos Verdes, CA 90275-1111	Voltage Droop Compensation for High Power Marx Modulators

Summary

The proposed voltage droop compensation scheme provides a simple, reliable and cost effective method to allow a high voltage Marx modulator to produce a flattop voltage pulse as specified in the ILC project. Other accelerator facilities which need long pulse modulators will also benefit from the results of this project.

Company

Far-tech, Inc.
3550 General Atomics Ct
Building 15 Suite 155
San Diego, CA 92121-1122

Title

Novel Linac Structure for Electron and Proton Accelerators

Summary

This project will build and test a novel linac accelerating structure. The design could be a breakthrough as it significantly simplifies the structure and is thus cost effective.

Company

Particle Beam Lasers, Inc.
18925 Dearborn Street
Northridge, CA 91324-2807

Title

Study of a Final Cooling Scheme for a Muon Collider Utilizing High-Field Solenoids

Summary

This scheme for cooling muons should facilitate muon colliders, muon radiography for medical and homeland security applications, and condensed matter studies, nanotechnology, and other technologies. The advancement of superconductor technology should extend the field range of nuclear Magnetic Resonance Imaging magnets.

Company

Alameda Applied Sciences Corporation
3077 Teagarden St
San Leandro, CA 94577-5720

Title

A Novel Gas Jet for Laser Wakefield Acceleration

Summary

Laser wakefield accelerators could drastically reduce the size and cost of particle accelerators for medical, research, and industrial applications. The valve developed in this project is an enabling technology to allow accelerators to be built that can operate at higher repetition rates. Such valves may also be used to conduct research on traumatic brain injury, leading to better head protection gear for soldiers and civilians alike.

Company

Radiabeam Technologies LLC
1717 Stewart Street
Santa Monica, CA 90404-4021

Title

The Micro Accelerator Platform: A New Particle Source for Industrial, Medical, and Research Applications

Summary

High-energy X-rays are currently used in cancer therapy, non-destructive testing, and cargo inspection, however, the equipment used to produce them is large and expensive. This project will produce a device using nanotechnology and manufacturing methods from the microelectronics world that is 1000 times smaller and much less expensive than current systems. This transformative technology could bring new hope to cancer sufferers, a better way to inspect our industrial products, and a new tool in baggage and container security.

Company

Haimson Research Corporation
3350 Scott Boulevard
Building 60
Santa Clara, CA 95054-3104

Title

Gradient Enhancement Research for Linear Accelerator Structures

Summary

The enhancement of accelerating gradient would significantly advance radio-frequency linear accelerator technology and would have a positive impact on the design of future linear colliders and accelerators for commercial applications.

Company Allcomp Incorporated 209 Puente Ave City of Industry, CA 91746	Title Thermally Conductive, Carbon Foam Material for Constructing Silicon-Based Detector Structures
Summary Development of thermally conductive, exceptionally lightweight carbon foam will offer silicon based detector designers new low-cost opportunities for solving complex thermal and structural issues. This carbon foam is the current answer to high temperature heat exchangers for both military and commercial aircraft; replacing aluminum, titanium, or Inconel as core materials.	

Company Cybosoft, General Cybernation Group, Inc. 2868 Prospect Park Drive Suite 300 Rancho Cordova, CA 95670-6065	Title Intelligent Actuation Control Using Model-Free Adaptive Control Technology
Summary This project will result in an intelligent actuation control solution that is critical to controlling future energy plants that can deliver maximum-energy-efficiency, near-zero-emissions, fuel flexibility, and multi-products. This solution can help the U.S. strengthen its energy independence, security, and movement towards a cleaner environment.	

STTR Project	
Company Anasys Instruments Corp 25 W. Anapamu, Suite B Santa Barbara, CA 93101-5151	Title Chemical Infrared Spectroscopic Imaging with Nanometer Spatial Resolution Using Atomic Force Microscopy
Summary The goal of this project is to use AFMs to perform chemical analysis on samples via IR spectroscopy at a resolution of sub-30nm. Successful realization of this goal would impact every American industry that relies on scientific research at the nano-scale with the most prominent examples being the Multi-Billion industries of Materials and Pharmaceuticals.	

STTR Project	
Company Aerosol Dynamics, Inc. 935 Grayson Street Berkeley, CA 94710-2640	Title An In-Situ Instrument to Assess the Concentration and Phase Partitioning of Atmospheric Semi-Volatile Organic Compounds
Summary Semi-volatile organic compounds are pervasive in the environment, in urban air, and in the global atmosphere, yet are poorly characterized. The proposed instrument will measure these compounds with hourly time resolution to increase knowledge of sources, formation mechanisms and effects on our environment.	

COLORADO

Company Tech-x Corporation 5621 Arapahoe Ave Boulder, CO 80303-1379	Title Virtual Instrumentation Experiment Optimization for High-Throughput Scientific Analysis
Summary By providing user-friendly Leadership Computing Facility access, neutron facility users will more rapidly transform their raw data into scientific results and discovery in the fields of advanced materials, biological systems, energy, and national security. The software tools produced by this Orbiter project will significantly help users provide better results sooner for complex systems.	

Company TDA Research, Inc. 12345 W. 52nd Ave. Wheat Ridge, CO 80033-1916	Title Novel Sorbents for Removal of Mercury, Arsenic, Sulfur and Halides from Coal-Derived Synthesis Gas
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Summary

The liquid fuels produced by FT synthesis using synthesis gas derived from coal can provide an immediately viable alternative to crude oil required to help provide energy independence to the U.S. This new gas clean-up process offers several key benefits that can increase the cost effectiveness of the FT process.

Company

TDA Research, Inc.
12345 W. 52nd Avenue
Wheat Ridge, CO 80033-1916

Title

Novel Catalytic Ammoxidation Process

Summary

Acrylonitrile is an important chemical intermediate for producing acrylic fibers, synthetic rubber and other polymers. Current catalysts operate at high temperatures and generate large quantities of unwanted byproducts. The new catalyst produces more acrylonitrile, less byproducts, can be used in existing petrochemical plants, and will increase the energy efficiency of acrylonitrile manufacture.

Company

Boulder Environmental Sciences And Technology, LLC
4425 Hastings Drive
Boulder, CO 80305

Title

Profiling Radiometer for Atmospheric and Cloud Observation (PRACO)

Summary

This project will develop a prototype of PRACO, a new tool for cloud observation. Some socio-economic benefits which PRACO's reliable forecasting will provide are improved civil government, industrial and military planning, increased natural hazard mitigation, response, and recovery, and hedging against uncertainty.

Company

Atmospheric Observing Systems, Inc.
1930 Central Avenue
Suite A
Boulder, CO 80301-2895

Title

The Ratiometric NDIR Analyzer for Robotic Platforms

Summary

This project will develop CO2 technology intended to produce a new data product, CO2 Weather. CO2 Weather will provide scientists with greater spatial resolution CO2 data and likewise inform individual American citizens on the environmental impacts of their daily lives and our predominant form of energy production.

Company

Anemergonics, LLC
7015 Nile Court
Arvada, CO 80007-7049

Title

SMarT??? Tower Systems for Small Wind Turbines
(Simple Modular Technology)

Summary

This project seeks to simplify installation and reduce the cost of electricity for small wind turbines on monopole towers. The will design, test, and market improved versions of its SMarT Tower system, including foundations.

Company

Composite Technology Development, Inc.
2600 Campus Drive, Suite D
Lafayette, CO 80026-3359

Title

Improved High-Temperature ESP Motor Lead Extension
Cables for Reliable Geothermal Power Production

Summary

Geothermal energy is a viable, environmentally-clean alternative energy source under development through the U.S. Department of Energy. This effort aims to provide robust power cables to increase the reliable lifetime of the downhole equipment necessary for commercial-scale geothermal energy production.

Company

TDA Research, Inc.
12345 W. 52nd Ave.
Wheat Ridge, CO 80033-1916

Title

Hydrogen Production for Refineries

Summary

North America contains large reserves of heavy crude oil, but it takes considerable hydrogen gas to refine them. This project will develop a new technology so that refineries can produce hydrogen at a cost that is much lower than hydrogen from conventional technologies or purchased hydrogen.

Company

Technology Applications, Incorporated
5700 Flatiron Parkway
Suite #5701A
Boulder, CO 80301-5718

Title

Flexible Cryostat for Superconductors

Summary

The feasibility of a novel approach termed fiber coated conductor for low AC loss superconductor wire has been demonstrated in Phase I and will be scaled up in Phase II. Advantages of low AC loss are ideal for multifilament cable fabrication that will lead to a revolution in HTS applications.

Company

Tech-x Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Title

Integrated Multiple Effects Software for Nuclear Physics Applications

Summary

Nuclear physics accelerators are powered by microwaves which must travel in waveguide pipes between their room-temperature sources and the near-absolute-zero temperature of the accelerator structures. Design and analysis of this equipment requires parallel-processing software that integrates the very different aspects of thermal and microwave analysis.

Company

Tech-x Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Title

Designing a Coherent Electron Cooling System for High-Energy Hadron Colliders

Summary

The Relativistic Heavy Ion Collider at Brookhaven National Laboratory is colliding protons and gold ions to create conditions similar to what existed after the big bang. Novel software is being developed to assist DOE scientists in the design of accelerator systems to improve this premier nuclear physics facility.

Company

Tech-x Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Title

Sparse Algebraic Multigrid Preconditioners for High-Order Finite Element Systems

Summary

The efficient usage of the DOE's massively parallel supercomputers maximizes the scientific insights that can be obtained over a given period of time. This efficiency is only possible with the continued improvements in the algorithms employed in today's complex computer models.

Company

Tech-x Corporation
5621 Arapahoe Ave
Boulder, CO 80303-1379

Title

Analyzing and Visualizing Next Generation Climate Data

Summary

The Mosaic grids adopted by atmospheric and ocean climate models are causing severe problems to post-processing and visualization applications. This project will develop software that will allow climate prediction tools to correctly interpret data on these novel grids.

Company Tech-x Corporation 5621 Arapahoe Ave Boulder, CO 80303-1379	Title Common Component Architecture for Electron Cloud Accelerator Simulations
Summary A significant amount of public resources have been invested in the development of software tools for computational accelerator physics. Component-based software development provides tools and practices for reusing existing algorithms, code, and applications, and it would make more efficient use of taxpayer's money.	

Company Tech-x Corporation 5621 Arapahoe Ave Boulder, CO 80303-1379	Title Schema-Based Environment for Configuring, Analyzing and Documenting Integrated Fusion Simulations
Summary To ensure safe and efficient future power production, fusion science needs comprehensive fusion device modeling. This project will develop user-friendly tools to configure, analyze, visualize, and optimize integrated fusion simulations on the Leadership Computing Facilities.	

Company Tech-x Corporation 5621 Arapahoe Ave Boulder, CO 80303-1379	Title Inverse Cyclotrons for Intense Muon Beams
Summary Intense muon beams are sought for their role in future scientific programs at a number of national labs. This project will develop a software suite to perform detailed end-to-end simulations of inverse cyclotron for use in generating such intense muon beams.	

Company Tech-x Corporation 5621 Arapahoe Ave Boulder, CO 80303-1379	Title Service-Oriented Architecture for Next Generation, Large-Scale Accelerator Control Systems
Summary This project will develop a Service-Oriented Architecture for next-generation, large-scale accelerator control systems to reduce the cost in developing and maintaining these control systems. The approach will produce more cost-effective and efficient scientific effort as more science of higher quality can be produced.	

CONNECTICUT

Company Molecular Neuroimaging, LLC 60 Temple Street, Suite 8A New Haven, CT 06510	Title Development of Automated Software Program for the Analysis of Alzheimer's Disease Beta-Amyloid Scans
Summary This project will apply the newly developed software, Objective and Generalized Tracer Evaluation (OGRE), to a prospective clinical study that will assess the utility of the advanced image processing package as an aid in the automated, early, and accurate diagnosis and monitoring of Alzheimer's patients.	

Company Omega-p, Inc. 258 Bradley St., 2nd fl. New Haven, CT 06510-1106	Title High-Power Microwave Switch Employing Electron Beam Triggering
Summary Progress in elementary particle high-energy physics depends on the evolution of technology to enable future machines to operate at higher energies than can be reached at present. The high-power microwave switches to be developed in this project are to allow tests of structures to sustain higher electric fields without breakdown, thus enabling operation at higher energy, and also opening up commercial applications with improved clinical accelerators, for example.	

Company Supramagnetics, Inc. 214 Canal Street Plantsville, CT 06479-1742	Title A New Multifilament Round Wire with Enhanced Bi2212 Texture for HEP High Field Magnet Applications
Summary A new economical Bi2212 superconductor with advanced performance will be developed for high field magnets utilized in high energy physics research, fusion machines, and MRI and NMR instruments for the general benefit of the public.	

Company R&d Dynamics Corporation 49 West Dudley Town Road Bloomfield, CT 06002-1421	Title Foil Gas Bearing Supported High Temperature Cathode Recycle Blower
Summary Large multi-megawatt size Solid Oxide Fuel Cell based Integrated Gasification Fuel Cell power plants are being developed and planned for the near future. R&D Dynamics will develop a reliable, oil-free and affordable cathode and anode recycle blower, capable of 850 oC, which will improve the energy efficiency of multi-megawatt size fuel cell systems and thus will help our nation use its most abundant fossil fuel resource in an environmentally friendly manner while creating green jobs.	

Company Precision Combustion, Inc. 410 Sackett Point Road North Haven, CT 06473-3106	Title Compact and Streamlined Oxy-Syngas Reheat Combustor
Summary In support of national goals for clean coal utilization and addressing global climate change, development of combustors for electric power generation is required. This project will experimentally demonstrate the performance of a novel reheat combustor with success leading to commercialization of power generation capability with efficient carbon sequestration.	

DELEWARE

STTR Project	
Company Compact Membrane Systems, Inc. 335 Water Street Newport, DE 19804-2410	Title Removal of Ammonia and Water to Enhance Yield of Kinetically-Controlled Beta-Lactam Synthesis
Summary This project will develop a platform technology to enhance chemical synthesis and also dry organics including fuel grade ethanol from biomass.	

FLORIDA

Company Parallax Research, Inc. P.O. Box 12212 Tallahassee, FL 32317	Title Parallel Data Collection Wavelength Dispersive X-Ray Spectrometer for Use on Scanning Electron Microscopes
Summary This project will develop a new type of high performance x-ray spectrometer for use on electron microscopes for measurement of elements in small features. This spectrometer will provide much faster analysis than competing systems.	

Company Accellogic LLC 1830 Main Street, Suite 204 Weston, FL 33326-3684	Title Enhancing Sca/LAPACKrc with Extremely-Fast Least-Squares Solvers for Heterogeneous CPU/FPGA Supercomputers
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Summary

This project will meet DOE's and the nation's rapidly increasing supercomputing requirements through software acceleration technology that will reduce execution times from hours to seconds for the important class of "least-squares" problems. This will enable breakthrough improvements in real-time medical imaging, faster and more accurate methods to find oil, and more reliable electric power grids -- among many other applications.

GEORGIA**Company**

Excellatron Solid State, LLC
263 Decatur Street
Atlanta, GA 30312-1705

Title

Novel Solid State Electrolyte Development

Summary

Further development of rechargeable lithium batteries requires dramatic improvement of the ionically conducting organic electrolyte presently used in the batteries. This project will develop a novel solid state electrolyte prepared by a sol gel technique that will improve lithium battery capabilities and safety, making the lithium batteries adequate for high energy applications such as electric vehicles.

Company

Ngimat Co.
5315 Peachtree Boulevard
Atlanta, GA 30341-2107

Title

Nano-Engineered Anodes for Lithium-ion Batteries

Summary

The goal of this project is to develop a critical energy storage component of Lithium-ion batteries that will power the next generation of Hybrid Electric Vehicles and off-grid energy storage facilities for the commercial and military sectors. Automobiles powered by batteries containing this component will reduce our dependence on foreign oil and batteries, reduce harmful emissions and strengthen global competitiveness of the U.S. battery and automobile industries.

Company

Phosphortech Corporation
351 Thornton Rd, Suite 130
Lithia Springs, GA 30122-4122

Title

Advanced Phosphor Technologies For Energy Efficient Lighting And Energy Harvesting

Summary

Upconversion nanophosphors will initiate new paradigms in the conservation and generation of energy. Highly efficient lamp and solar cell technologies will be produced and revolutionize the U.S. lighting and solar power industries, by providing competitive technologies that will significantly reduce global energy use and environmental pollution.

ILLINOIS**Company**

Muons, Inc.
552 N. Batavia Ave
Batavia, IL 60510

Title

Multi-Purpose Fiber Optic Sensors for HTS Magnets

Summary

Optical fiber based sensors are being developed to monitor and protect HTS super conducting magnets used for particle accelerators, fusion reactors, and magnetic resonance imaging.

STTR Project**Company**

Muons, Inc.
552 N. Batavia Ave
Batavia, IL 60510

Title

Pulsed Focusing Recirculating Linacs for Muon Acceleration

Summary

Fast acceleration techniques are being developed for future Neutrino Factories and Muon Colliders using the high gradient RF cavities that are being developed the International Linear Collider. A Muon Collider would provide a path back to the energy frontier for the U.S. high energy physics program.

STTR Project**Company**

Muons, Inc.
552 N. Batavia Ave
Batavia, IL 60510

Title

RF Breakdown Studies using Pressurized Cavities

Summary

This project will develop a new technique using high-pressure gas to study breakdown mechanisms of RF cavities needed for particle accelerators. This will provide cost reductions and performance improvements for many planned accelerators.

MASSACHUSETTS**Company**

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Title

Characterization of Particulate Organic via Combined Thermal Desorption Aerosol Gas Chromatography and Aerosol Mass Spectrometry (TAG-AMS)

Summary

Small airborne particles generated from energy-related activities can adversely impact global climate, human health, and visibility. This project will develop an instrument with unique capabilities for identifying and measuring the organic constituents of aerosol particles, leading to a better understanding of the sources, transformations, and fates of organic atmospheric particulate matter.

Company

Aerodyne Research, Inc.
45 Manning Road
Billerica, MA 01821-3976

Title

Dual Laser Isotopic Flux Monitor for Carbon Dioxide and Water Vapor

Summary

The increasing concentration of carbon dioxide in the Earth's atmosphere must be understood since carbon dioxide is the key driver of global warming. This novel instrument will quantify the sources and sinks of carbon dioxide by rapidly measuring the concentrations of the stable isotopes of both carbon dioxide and water.

Company

Boston Applied Technologies, Incorporated
6F Gill Street
Woburn, MA 01801-1721

Title

A Field-Portable Polarization Imaging System for Remote Sensing

Summary

A high performance polarization imaging system covering from visible wavelength to mid-infrared wavelength will find broad applications in both government and commercial markets. A novel electrooptic material will be used to develop the imaging system, which offers highest electro-optical constant in the world, broad spectral band, high speed, and very low hysteresis. It will carry a tremendous commercial potential for the next generation of polarization imaging instruments.

Company

Boston Applied Technologies, Incorporated
6F Gill Street
Woburn, MA 01801-1721

Title

High-Throughput Ultra-Fast Tunable Filter for Multispectral Imaging

Summary

A series of color pictures from specific target will improve detection and discrimination capability. This multi-color remote sensing is an enabling technology for security and military surveillance. The proposed filter will greatly improve the performance of this technology.

Company

Capesym, Inc.
6 Huron Drive, Suite 1B
Natick, MA 01760-1325

Title

Detached Growth of Nuclear Detector Materials

Summary

This program seeks to develop high quality, low-cost materials for radiation detectors used in homeland security, medical diagnostics, and nuclear industry.

Company

Celltech Power, LLC
131 Flanders Road
Westborough, MA 01581-1031

Title

Liquid Tin Anode Direct Coal Fuel Cell

Summary

The development of clean, efficient, coal power generation technology is fundamental to USA energy security. The Liquid Tin Anode Fuel Cell can provide low cost, high efficiency power from coal while enabling capture of up to 90% of the CO₂ produced. This project will address key risks to the commercialization of this technology by thoroughly testing the core fuel cell components.

Company

Coating Technology Solutions Inc.
36 B Munroe Street
Somerville, MA 02143-2009

Title

High Performance Diamond Detectors

Summary

Man-made diamond will be developed to improve discovery of fundamental laws of physics and to improve radiation survival rated for cancer patients.

Company

Crystal Systems, Inc.
27 Congress Street
Salem, MA 01970

Title

Material Utilization and Waste Reduction through Kerf Recycling

Summary

Currently, when silicon ingots are sliced into wafers for solar cells, nearly half of this expensive silicon ends up being wasted in the silicon swarf (or sawdust). A little used alternative technique for slicing silicon into wafers will allow this silicon sawdust to be recycled into new, high quality silicon ingots.

Company

Diversified Technologies, Inc.
35 Wiggins Avenue
Bedford, MA 01730-2314

Title

Power Supply for Ion Cyclotron Resonance Heating

Summary

This project will develop advanced RF transmitter capabilities for existing U.S. fusion experiments which also will be available to international for future fusion experiments.

Company

Giner Electrochemical Systems, LLC
89 Rumford Avenue
Newton, MA 02466-1311

Title

Anode Concepts for SO₂ Crossover Reduction in the HyS Electrolyzer

Summary

Inexpensive, carbon-free hydrogen production is crucial to the strategy of efficiently powering our vehicles with this emissions-free fuel. This project will aid DOE's nuclear hydrogen development efforts by further improving Hybrid Sulfur electrolyzer design and, thereby, the efficiency and economic viability of this thermochemical cycle.

STTR Project**Company**

NOVA Scientific, Inc.
10 Picker Road
Sturbridge, MA 01566-1251

Title

Compact and Efficient Cold and Thermal Neutron Collimators

Summary

This project will develop compact neutron collimators to improve neutron radiography. This will provide researchers with beam collimation improvements and more sensitive instrumentation with higher contrast capability for biological specimens and materials research. It will further US technology leadership in neutron sciences.

STTR Project**Company**

Optra, Inc.
461 Boston Street
Topsfield, MA 01983-1234

Title

H-PDLC Tunable Filter for Hyperspectral Imaging

Summary

This project will design, develop, and test a tunable wavelength filter using a new and novel liquid crystal based material. The filter will find application in monitoring systems for detecting Weapons of Mass Destruction (WMD).

Company

Pharyx, Inc.
49 Hemenway St #3
Boston, MA 02115

Title

Microbioreactor Technology for Obligate Anaerobes

Summary

Anaerobes are the source of industrially useful products such as liquid biofuels. Because they are sensitive to oxygen, these organisms are very difficult to culture. This project will develop compact, easy-to-use, disposable devices for culturing anaerobes, which would provide a great benefit to industries that are dependent on culturing anaerobes.

Company

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810-1077

Title

Impermeable SiC Composites

Summary

Development of impermeable high temperature composite technology will enable the nation to develop leap frog nuclear power technology and high performance gas turbines, reducing the nation's dependence on foreign energy supplies and helping protect the environment. Leadership in high temperature materials technology will allow American manufacturers to maintain global leadership in gas turbine technology and improve our balance of trade.

Company

Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810-1077

Title

Frequency Doubler for CO2 Laser ITER Diagnostics

Summary

The ITER fusion reactor will lead the way for a future energy supply that is safe, does not generate greenhouse gases, and has an almost unlimited fuel. DOE plasma diagnostics are based on a CO2 laser and high efficiency color converting crystal for which this project will provide a one-hundred-fold improvement.

Company

Prosensing, Inc.
107 Sunderland Road
Amherst, MA 01002-1098

Title

High Resolution Millimeter Wave Radar-Radiometer System for Volume Imaging of Clouds

Summary

The role of clouds in regulating incoming solar radiation and upwelling infrared radiation is a poorly understood factor affecting global climate. This project will develop a high resolution scanning cloud radar designed specifically to test cloud model predictions.

Company

Q-peak, Incorporated
135 South Road
Bedford, MA 01730-2307

Title

Mid IR Ultrafast Laser System for High Field Physics

Summary

Revolutionary advances in fundamental studies of atoms, molecules and solids have been made possible by development of ultra-high-power, ultra-short pulse lasers and associated optics to generate intense X-ray pulses. Spin-off applications of the advances cover a wide and diverse area, ranging from diagnostic medicine to remote detection of hidden explosives and other weapons of mass destruction. This project will make a significant advance in the laser technology needed for the next generation of ultrafast X-ray systems, and will also reduce their cost and complexity.

Company

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title

High Performance Neutron Detector

Summary

The high performance superconducting radio frequency accelerators needed to explore the frontiers of particle physics require high purity, chemically treated surfaces. The new, acid-free electropolishing methods developed in this project will facilitate implementation of environmentally friendly, "Green" production methods and result in significant cost savings.

Company

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title

Advanced Scintillation Detector for Synchrotron Facilities

Summary

The development of the scintillator proposed here will enable the full potential of current state-of-the-art X-ray detectors, which is critical for basic research at synchrotron sources. Medical imaging, X-ray scanning equipment at airports and border control, detectors for homeland security, and small animal research, which is so important for the development of new drugs in a rapid and cost effective manner, will also benefit from this technology.

Company

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title

Novel Approach for Depth-of-Interaction Encoding in PET

Summary

This project will investigate a novel detector technology that will be very useful in nuclear medicine studies. It will also be useful in other scientific studies (such as high energy particle physics and space research), homeland security as well as commercial applications (such as oil exploration and non-destructive evaluation).

Company

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title

High Resolution Scintillators for SPECT

Summary

This project will investigate a novel detector technology that will be very useful in medical imaging. It will also be useful in other scientific studies (such as high energy physics and space research) as well as commercial applications (such as oil exploration, medical imaging, and non-destructive evaluation).

Company

Radiation Monitoring Devices, Inc.
44 Hunt Street
Watertown, MA 02472-4699

Title

Advanced Detectors for PET

Summary

This project will investigate a promising detector technology that will have major impact in scientific studies, health care, homeland defense, oil exploration as well as industrial applications.

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Optical Detector with Integrated ADC for Digital Readout
Summary Advances in physics often track advances in detector technologies. This project provides a low cost, compact detector solution that facilitates the construction of large detector arrays used in fundamental physics experiments.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title Fast, Low Noise Photodetectors for Nuclear Physics
Summary The proposed project aims to investigate a new detector technology that will have far reaching implications in fundamental scientific studies as well as commercial applications. It will be useful in diverse fields such as physics research, homeland security, medical imaging, and astronomy.	

Company Radiation Monitoring Devices, Inc. 44 Hunt Street Watertown, MA 02472-4699	Title New Approach for Lanthanide Halide Crystal Growth
Summary The proposed project will investigate a novel detector technology that will be very useful in nuclear non-proliferation monitoring. It will also be useful in other scientific studies (such as high energy physics and space research) as well as commercial applications (such as oil exploration, medical imaging, and non-destructive evaluation).	

Company Spectral Sciences, Inc. 4 Fourth Avenue Burlington, MA 01803-3304	Title Full Spectral Signature Simulation Models for Chemical Releases
Summary Technologies enabling remote detection, identification and quantification of trace gases in the atmosphere provide critical information for uncovering activities associated with proliferation of weapons of mass destruction. Accurate chemical release signature and sensor performance models will be developed for this problem and, more generally, for environmental monitoring.	

STTR Project	
Company Supercon, Inc. 830 Boston Turnpike Shrewsbury, MA 01545-3301	Title Insulation Materials and Methods for Bi2212 Magnets
Summary The goal of the program is to reduce the cost and risk associated with producing high temperature superconducting magnets for high energy physics, while also improving performance. Material development to advance the technology of high temperature, high field superconductors is necessary for maintaining U.S. leadership in the fields of materials science, biomaterials, and high energy physics.	

Company Surmet Corp 31 B Street Burlington, MA 01803-3406	Title Selective Emitter Based Energy Efficient Incandescent Lamp Technology
Summary New high energy efficiency incandescent lamps based on our technology can produce substantial energy savings and attendant reduction in carbon emissions. This project will develop a product that will have high acceptance from consumers and one that is suited for use in the 2 billion incandescent lamps sockets that exist in USA.	

Company Tiax, LLC. 35 Hartwell Avenue Lexington, MA 02140--230	Title Heat Activated Metal Hydride Refrigeration Cycle
Summary Roughly two-thirds of the fuel used in electric power plants to generate electricity is wasted in the form of dissipated heat. This project will develop refrigeration technology which will make use of this heat to cool buildings or provide refrigeration for supermarkets and industry.	

Company Tiax, LLC. 35 Hartwell Avenue Lexington, MA 02140--230	Title High Voltage Electrolyte for Lithium-Ion Cells
Summary Technology is being developed to improve performance and reduce costs of batteries for PHEVs and HEVs, which will make these vehicle technologies more commercially viable, and thus increasing the likelihood that they will yield their potential environmental, economic and political benefits.	

Company Use, Inc. 665 Amherst Road Sunderland, MA 01375-9420	Title Acetic Acid Manufacture by the Selective Photocatalytic Oxidation of Ethylene
Summary Acetic acid is a large volume commodity chemical that is a vital building block in the U.S. chemical industry. Current production technologies are inefficient. The proposed technology will cut energy consumption in half, reduce greenhouse gas emissions, improve efficiency of use of hydrocarbons, reduce dependence on foreign oil, and improve U.S. employment in the chemical industry.	

Company Use, Inc. 665 Amherst Road Sunderland, MA 01375-9420	Title Reduction in Distillation Usage in the Manufacture of Biomass Ethanol by Reactive Water Separation
Summary The production of ethanol from biomass can become an important source of transportation fuels, reducing the need for imported oil and enhancing U.S. employment. The proposed program substitutes a novel technology for the energy-intensive ethanol dehydration steps now used in fuel grade ethanol production. It offers major reduction in the energy consumption for ethanol manufacture, at the reduced costs needed for cellulosic biomass use.	

MARYLAND

Company Edgewater Federal Solutions FKA Edgewater Technology Associates, Inc. 3528 Worthington Blvd. Suite 301 Urbana, MD 21704-7014	Title Search Enhancement with Adaptive Thesaurus and Ontology Resources
Summary This research project aims to improve the methods for creating, organizing, maintaining, and using scientific and technical reference thesauri and semantic knowledge bases for the purpose of improving the quality and usefulness of search results from scientific and technical databases.	

Company Chesapeake Perl, Inc. 8510A Corridor Road Savage, MD 20763	Title Identification, production and characterization of novel lignase proteins from termites for depolymerization of lignocellulose Pretreatment/Biochemical
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Summary

Termites have solved the problem blocking efficient biofuel production from switch grass, corn stover, and wood pulp; they can degrade lignin and hemicellulose, the chemicals which interfere with ethanol fermentation. This project is identifying key termite enzymes, and developing ways to produce them for manufacturing next generation biofuels.

Company

Plant Sensory Systems, LLC.
6204 Blackburn Lane
Baltimore, MD 21212

Title

Increased Seed Oil by Metabolic Regulation

Summary

Increased oilseed productivity per acre is needed to help meet the biodiesel demand. The proposed research will move a novel gene construct into canola to function as a master switch to increase seed oil content.

MAINE**Company**

Angel Secure Networks, Inc.
20 Godfrey Drive
Orono, ME 04473-3610

Title

Control and Data Plane Security of High Performance Networks

Summary

High performance networks which are used to support major scientific experiments cannot be protected against cyber attacks by conventional security techniques. This approach is a software system which uses secure networking techniques to protect the network from cyber attack with no loss of network speed, performance, or availability.

MICHIGAN**Company**

Electrocon International Inc.
405 Little Lake Drive, Suite C
Ann Arbor, MI 48103

Title

Simulating the Smart Electric Power Grid of the 21st Century

Summary

This project proposes the development of a simulation tool that will give electric power grid engineers the ability to design and evaluate the fast, wide-area control needed to avoid cascading outages and blackouts. This next generation program will integrate some of the disparate simulation programs of today with new control and communication models to analyze and design the smart grid of tomorrow.

Company

Michigan Aerospace Corporation
1777 Highland Drive, Suite B
Ann Arbor, MI 48108-2285

Title

Real-Time Optical MEMS-Based Seismometer

Summary

Monitoring of low-yield nuclear detonations is difficult with current seismic monitoring systems which are bulky, expensive, and difficult to deploy rapidly. The probability of detecting low-yield tests drops significantly if the explosion is below one kiloton. The proposed effort will develop a seismometer that is compact, ultra-sensitive and easily deployed for immediate monitoring of man-made seismic activities in critical locations. In addition, the seismometer will have applications in oil prospecting and mining activities, as well as space exploration, surveillance, and a variety of scientific studies, including volcano and earthquake monitoring research.

Company

Niowave, Inc.
1012 North Walnut Street
Lansing, MI 48906-5061

Title

Development of a Superconducting RF 1.5 GHz Landau Cavity for Synchrotron Light Sources

Summary

This project will develop superconducting 1.5 GHz Landau cavities that will greatly increase the beam lifetime of future light sources such as the NSLS-II. This research would lead to a domestic supplier of superconducting RF cavities for existing and planned light sources.

Company Niowave, Inc. 1012 North Walnut Street Lansing, MI 48906-5061	Title Development of SRF Multi-Spoke Cavities for Electron Linacs
Summary Future nuclear physics facilities will require high current electron linear accelerators. This project will develop superconducting multi-spoke cavities that offer several advantages over the elliptical structures used to date to accelerate electrons near the speed of light.	

MISSOURI

Company Eentec 1100 Forest Ave Kirkwood, MO 63108	Title Seismic Detection Mini Seismometer
Summary A miniaturized high-resolution low cost seismometer will assist DOE tasks in providing detection systems for nuclear treaty monitoring under tight budgets, allow valuable scientific information for earthquake analysis, offshore oil undersea exploration, and structural engineering leading to better public safety, modifications of building codes, reinforcement of building, bridges, dams, etc.	

Company Titanova, Inc 12724 Pennridge Drive Bridgeton, MO 63304	Title Novel Diode Laser Cladding of High Temperature Alloys for Used in Ultrasupercritical Coal-Fired Boilers
Summary This project will develop and certify direct diode laser systems and processes for cladding future ultrasupercritical and existing coal-fired boiler fireside components. It will result significant improvements in clad material properties and fabrication costs, resulting in an increase in boiler efficiencies, thus reducing utilities pollution and carbon dioxide emissions.	

MONTANA

STTR Project Company Resonon, Inc. 619 N. Church Avenue Suite 3 Bozeman, MT 59715-3087	Title Hyperspectral Sensor for Large-Area Monitoring of Carbon-Dioxide Reservoirs and Pipelines
Summary This project will bring about an order of magnitude decrease in size from current models. It will enable a more widespread network of detectors used to detect nuclear material proliferation laid out by the DNDO. It's unprecedented low cost, ruggedness, low power requirements and high efficiency will also find use in physics experiments, new imaging technology and neutron radiation therapy.	

NEBRASKA

Company Li-cor Biosciences 4647 Superior Street Lincoln, NE 68504-1357	Title A Closed-Path Methane and Water Vapor Gas Analyzer
Summary This project will develop an economical, robust, and reliable methane and water vapor gas analyzer capable of long-term measurements in remote areas for climate change and environmental research. Such measurements are essential for quantifying the amount of CH ₄ released from various ecosystems (wetlands, rice paddy and forest etc) and other surface contexts (e.g. landfills, animal husbandry lots etc.), understanding dynamics of atmospheric methane budget and their impact on climate change and global warming.	

NEW HAMPSHIRE

Company	Title
Creare Incorporated 16 Great Hollow Road P.O. Box 71 Hanover, NH 03755-3116	A Magneto-Hydrodynamic System for Generating High-Pressure Impluses in Spallation Targets
Summary This project will develop a system to model and analyze the mechanisms behind wall erosion on the Spallation Neutron Source target at the Oak Ridge National Laboratories. This work will help enable the facility, which is used for materials science research, to operate at higher efficiency and lower cost.	

Company	Title
Xemed, LLC 16 Strafford Avenue Durham, NH 03824	Ex-situ Polarized ^3He Neutron Spin Filter and Analyzer System
Summary This project's technology for producing large quantities of nuclear polarized ^3He gas can serve dozens of experiments at the Spallation Neutron Source in Tennessee and at Los Alamos. This project would allow investigations into the magnetic structures of thin films and offer synergistic benefits for diagnostic medical imaging of lung function.	

NEW JERSEY

Company	Title
Diamond Materials Inc. 120 Centennial Avenue Piscataway, NJ 08854	Diamond-Hardfaced Nanocomposites for Extended Service Lives of Pump Berings in Geothermal Wells
Summary Geothermal energy production is one of several proven technologies that promise to make significant contributions to U.S. energy independence within the next 20 years. This project addresses the challenge of achieving increased lifetime for a geothermal pump bearing, thus increasing operating efficiency and reducing energy production cost.	

Company	Title
Integrated Photonics, Inc. 132 Stryker Lane Hillsborough, NJ 08844	Neodymium-Containing Single Crystals for Neutrinoless Double Beta Decay Detection
Summary Neutrinos are the most prolific of all elementary particles so that knowledge of their mass is critically important to our understanding of the birth and evolution of the universe. Neutrino-less double-beta decay experiments have been identified by the Nuclear Science Advisory Committee of the NSF and DOE as a most important next step to complement the exciting space telescope data by determining the mass scale of neutrinos.	

Company	Title
NEI Corporation 400 Apgar Drive, Suite E Somerset, NJ 08873-1154	Membranes for Solid State Lithium Batteries
Summary A solid electrolyte membrane technology is being developed that will enable a new generation of cost effective lithium-ion batteries with improved safety and energy storage capacity.	

Company	Title
NEI Corporation 400 Apgar Drive, Suite E Somerset, NJ 08873-1154	Enhancing the Heat Exchanger Performance Through the use of Durable Superhydrophobic Surface Treatment

Summary

The proposed program to implement a nanotechnology-based surface treatment on industrial vapor-to-liquid heat exchangers has the potential to enhance the performance of heat exchangers by an order of magnitude, thereby improving the energy efficiency of industrial processes, including power generation through renewable and non-renewable energy source.

Company

NEI Corporation
400 Apgar Drive, Suite E
Somerset, NJ 08873-1154

Title

Self-Healing Polymeric Coatings: Beyond Scratch-Healing

Summary

A nano-composite self-healing coating technology is being developed to significantly enhance the operational life of industrial coatings, thereby greatly reducing maintenance cost.

Company

NEI Corporation
400 Apgar Drive, Suite E
Somerset, NJ 08873-1154

Title

High Performance Fluoroelastomer Nanocomposite Seals For Geothermal Submersible Pumps

Summary

This project will enhance the properties of elastomeric seals for use in geothermal energy production has the potential to prevent failure of equipment and to allow the downhole equipment to run unattended for extended periods of time, greater than 5 to 10 years, without maintenance.

Company

NEI Corporation
400 Apgar Drive
Suite E
Somerset, NJ 08873-1154

Title

Nanotechnology-Based Self-Healing Coating System to Enable Extensive Use of Magnesium Alloys in Automotives

Summary

The nanotechnology based self-healing coating system is designed to enable use of magnesium alloys in automobiles and hence increase their fuel efficiency.

Company

NEI Corporation
400 Apgar Drive
Suite E
Somerset, NJ 08873-1154

Title

A New Class of Nanocomposite Treatment Media for Efficient Mercury Remediation

Summary

A nano-particle based technology is being developed to advance the state of the art in mercury remediation in contaminated DoE sites, thereby leading to cost savings and reducing the time for remediation.

Company

Nova Photonics, Inc.
One Oak Place
Princeton, NJ 08540-4701

Title

An In-Situ Calibration System for the MSW Diagnostic on ITER

Summary

Experiments that study the potential for a safe and abundant energy source from magnetically confined fusion rely on the accurate measurements of magnetic fields. Next-generation devices pose new challenges for the calibration of existing techniques, and this project will prototype an in-situ calibration system that additionally enhances the measurement.

Company

Nova Photonics, Inc.
One Oak Place
Princeton, NJ 08540-4701

Title

Rapidly Tunable Optical Filter

Summary

This project will develop a rapidly tunable wide field-of-view optical filter with flexible design parameters including bandwidth and spectral range. The filter has numerous applications for remote sensing, environmental monitoring, and medical imaging.

Company

Policell Technologies, Inc.
160 Liberty Street, Building #4
Metuchen, NJ 08840

Title

Development of Separators for Lithium-Ion Cells with High Temperature Melt Integrity

Summary

Commercial separator products shrink at high temperatures. This shrinking problem could cause an internal short-circuit of batteries. This safety problem is delaying the introduction of lithium-ion batteries into large format systems such as hybrid electric vehicles. This project will develop separators that are thermally stable for making safe batteries.

Company

Universal Display Corporation
375 Phillips Blvd.
Ewing, NJ 08618-1428

Title

Enhanced WOLEDs Outcoupling Using Low Index Grids

Summary

This project will increase the conversion efficiency of electrical energy into light of white-organic-light-emitting devices and thereby enable replacement of inefficient conventional incandescent bulbs, which consume over 8% of the electricity produced in the United States.

NEW MEXICO**Company**

Deep Web Technologies, LLC
301 N. Guadalupe
Suite 201
Santa Fe, NM 87501-5501

Title

Enabling Comprehensive One-Stop Access to World-Wide Scientific and Technical Research

Summary

There are thousands of sources of quality science information available that most scientists and researchers are not aware they exist. This project will create a clearinghouse that will make these information sources discoverable and accessible leading to an acceleration of scientific discovery.

Company

Southwest Sciences, Inc.
1570 Pacheco Street
Suite E-11
Santa Fe, NM 87505-3993

Title

Magnetometer for the Neutron Electric Dipole Moment Experiment

Summary

This project uses lasers and atomic physics to measure magnetic fields with high sensitivity. This capability will benefit DOE's fundamental research, but also has spin-off applications in medicine, mineral exploration, and homeland security.

Company

Star Cryoelectronics, LLC
25 Bisbee Ct., Ste. A
Santa Fe, NM 87508-1338

Title

Next-Generation Readout Electronics and Sensor Subsystem for nEDM

Summary

This project will develop a next-generation readout electronics for ultra-sensitive superconducting sensors that are critical components of key experiments in nuclear physics, such as the search for the neutron electric dipole moment (nEDM), as well as for numerous commercial applications in biomedical imaging, geophysical exploration, non-destructive testing of materials, and basic research. This broad range of commercial applications offers many benefits to the general public in terms of improved health care, natural resource availability, and consumer product reliability.

Company Symphony Acoustics, Inc. 103 Rio Rancho Blvd. NE Suite B-4 Rio Rancho, NM 87124-1441	Title Laser Interferometric Miniature Seismometer
Summary This project will develop a sensor that is a critical strategic tool in the fight against nuclear proliferation. This seismic sensor will be 1/50th the size of existing components, and will be easily deployable around the globe.	

Company Vista Photonics, Inc. 67 Condesa Road Santa Fe, NM 87508-8136	Title Large Area Leak Sensor for Sequestered Carbon Dioxide
Summary Inexpensive high-performance sensors are required in the field to detect leaks of carbon dioxide from permanent geologic storage sites. The prototype laser sensor technology will provide the required measurements for an exceptional value.	

Company Vista Photonics, Inc. 67 Condesa Road Santa Fe, NM 87508-8136	Title Price-Protected High-Precision Carbon Dioxide Analyzer
Summary Inexpensive high-performance carbon dioxide sensors are required in the field to understand global warming. This project's commercialized laser sensor technology will provide the required measurements for an exceptional value.	

NEW YORK

Company Acent Laboratories LLC 3 Scott Lane Manorville, NY 11949-2623	Title A Novel Low Cost, High Efficiency, Algal Biomass Harvest and Dewatering Technology for Biodiesel Production
Summary Biodiesel produced from microalgae has been identified as an attractive renewable fuel though the cost to produce it is not yet economically attractive. This project will develop a low cost, high efficiency algae harvesting and dewatering system to address one of the key process steps and hence facilitate the widespread utilization of this feedstock.	

Company Advanced Energy Systems, Inc. 27 Industrial Blvd, Unit E Medford, NY 11763-2286	Title High Power Fundamental Power Coupler for Next Generation Light Sources
Summary This project will develop a High Power Fundamental Coupler for third generation light sources such as the BNL NSLS-II. Technology developed from this effort will have application to fourth and higher generation light sources as well as high current/high power accelerators of the future.	

Company Advanced Energy Systems, Inc. 27 Industrial Blvd, Unit E Medford, NY 11763-2286	Title Improved Superconducting Accelerator System for Next Generation Light Sources
Summary Modern synchrotron light sources place ever higher demands on SRF acceleration to achieve peak performance. This project will develop an advanced SRF system to meet these demanding specifications. This advanced design will put a U.S. industrial firm in the global marketplace currently dominated by foreign suppliers.	

Company Advanced Energy Systems, Inc. 27 Industrial Blvd, Unit E Medford, NY 11763-2286	Title Development of Reduced-Cost Helium Vessels for ILC Cavities
Summary The International Linear Collider (ILC) promises to open new frontiers in high energy physics. This can only happen if the machine is affordable to the worldwide community. This project will address one of the cost drivers for the 16,000 superconducting cavities and has the potential to save \$130M for the project.	

Company Applied Pulsed Power, Inc. 2025 Dryden Road P.O. Box 348 Freeville, NY 13068	Title Optically Pumped High Power Solid State Switch
Summary New switching components are needed to improve electrical efficiency and reduce costs for electric power generation, transmission, and for applications such as radar. This project will develop a faster and lower cost switch than what is currently available.	

STTR Project	
Company Energy Research Company 2571-A Arthur Kill Road Staten Island, NY 10309-1232	Title On-Line, Real Time Coal Measurement and Data Processing to Optimize Boiler Operations
Summary Coal-fired electric power plants suffer from outages and reduced efficiency due to the coal byproducts sticking to and clogging the equipment. This project will develop an instrument that measures coal properties and avoids this problem. This will increase a power plant's electric output which will lower consumer's costs and reduce greenhouse gases.	

Company Enogetek Inc. 2055 Albany Post Road Suite AT-6 Croton-on-Hudson, NY 10520-1156	Title High Performance Hydroxyl Conductive Membrane For Advanced Rechargeable Alkaline Batteries
Summary Successful completion of the current program will make significant a contribution toward development of the key energy storage system that can make the utilization of alternative energy more practical and stable. The technology could also be used in HEV and PHEV to improve the energy efficiency of the vehicles.	

Company Kitware, Inc. 28 Corporate Drive Clifton Park, NY 12065-8688	Title Collaborative Visualization for Large-Scale Accelerator Electromagnetic Modeling
Summary The proposed work will create software tools that enable collaboration for viewing, interacting, and analyzing large data sets across geographically separated work-sites.	

Company Reservoir Labs, Inc. 632 Broadway Suite 803 New York, NY 10012-2614	Title High Performance Networks - Compilation and Optimization of Protocol Analyzers
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Summary

The volume and sophistication of cyber attacks on nationally critical infrastructure and defense systems is growing, and beginning to overwhelm our existing, reactive, low-coverage, cyber defenses. This project will develop a new pro-active, high-coverage, defense technology based on new state-of-the-art compiler technologies.

Company

Reservoir Labs, Inc.
632 Broadway
Suite 803
New York, NY 10012-2614

Title

Advanced Static and Dynamic Scheduling of HPC Applications on Petascale Computer Systems with GPU Accelerators

Summary

Inexpensive Graphics Processing chips are a potentially very cost- and power-efficient engine for supercomputing that can accelerate advances for important problems that such as climate modeling, medical imaging, and energy exploration. What has been holding back GPGPUs until now has been programmability. This project will build programming tools to make GPGPU based supercomputing feasible.

Company

Tetragenetics, Inc.
95 Brown Road
Ithaca, NY 14850

Title

Overexpression and Rapid Purification of Membrane and Secretory Proteins in Tetrahymena

Summary

Genetically engineered proteins have become increasingly important in a wide range of applications that extend from alternative fuel production to the treatment of human and animal disease. This project is aimed at the development of new technologies for rapid production of these proteins at the lowest possible cost.

Company

United Environment & Energy LLC
111 Ridge Road
Horseheads, NY 14845-1507

Title

Structured Catalyst for Biodiesel Production

Summary

Although interest in biodiesel is rapidly increasing, the process by which biodiesel is synthesized has not changed much in the last two decades and is far from being efficient. This project aims to develop a high efficiency, high productivity, and low cost biodiesel production technology.

Company

Your File System Inc.
255 W 94TH Street PHB
New York, NY 10025

Title

YFS, a High Performance Global File System That is Backward Compatible with AFS

Summary

AFS is a distributed file system which is widely deployed throughout the High Energy Physics research community, however, it can no longer satisfy the demands placed upon it by growth. Unfortunately, migrating to alternate solutions has proven difficult or impossible. The goal of this project is to develop a new commercially available global file service. This will allow AFS users to achieve productivity improvements without costly and painful transitions between incompatible systems.

OHIO**Company**

Euclid Techlabs, LLC
5900 Harper Rd. #102
Solon, OH 44139-1866

Title

Development of a Diamond-Based Cylindrical Dielectric Loaded Accelerating Structure

Summary

This project will develop a manufacturing technology for artificial diamond tubes to be used in dielectric loaded accelerating structures. These diamond structures are expected to attain record high accelerating gradients. The results will be also applied to next-generation research accelerators and high power microwave systems as well as to medical equipment development.

Company	Title
Faraday Technology, Inc. 315 Huls Drive Clayton, OH 45315-8983	Faradayic ElectroEtching of Stainless Steel Bipolar Plates
Summary	
This project will enable a high volume, low-cost, environmentally benign manufacturing process for bipolar plates for polymer electrolyte membrane fuel cells. This will facilitate the viability of fuel cells with an environmental and societal benefit in terms of reducing pollution and increasing manufacturing job opportunities in the United States.	

STTR Project	
Company	Title
RNET Technologies, Inc. 240 West Elmwood Drive Suite 2010 Dayton, OH 45459-4248	Creating Scalable Petascale File Systems using Application-Aware Network Offloading
Summary	
Parallel file systems are required to access data on current and emerging supercomputers. Currently, these file systems have bottlenecks, which can severely affect many of the applications running on the expensive supercomputers. Hence, key components of a parallel file system must be optimized using advanced hardware and software solutions. This project will accomplish these using a 10 Gigabit Ethernet “SmartNIC” that was developed on a prior DOE Phase II SBIR contract.	

Company	Title
Sci Engineered Materials, Inc. 2839 Charter Street Columbus, OH 43228	Homogenous BSCCO-2212 Round Wires for Very High Field Magnet
Summary	
The Department of Energy’s National Laboratories require higher field magnets than currently available for high energy physics experimentation. This project addresses this need by improving the properties of ceramic high temperature superconductors by defining powder processing conditions for BSCCO-2212 powder that improves the superconducting properties of wires made with these materials.	

OREGON

Company	Title
Trillium Fiberfuels, Inc. 33898 SE Eastgate Circle Corvallis, OR 97333-2248	Xylose Utilization for Ethanol Production Enabled by a Parallel Microfiber Reactor with Immobilized Xylose Isomerase
Summary	
Greatly increased supplies of sustainable liquid fuels such as cellulosic ethanol are clearly needed in the U.S. This project will develop a novel process that enables the fermentation of xylose via an enzymatic conversion—resulting in higher-yield, lower-cost processing of cellulosic ethanol as a replacement for gasoline.	

PENNSYLVANIA

Company	Title
Maxpower, Inc 141 Christopher Lane Wayne, PA 19438-2035	Development of High Temperature Melt Integrity Separators for Lithium-Ion Cells
Summary	
During high power use and abuse situations, a battery can become quite hot causing the internal separator to fail, possibly resulting in explosion and fire. Electro-spinning technology is being used to create robust separators that will withstand higher temperatures before failure, significantly increasing lithium-ion battery safety.	

TENNESSEE

Company	Title
Analysis And Measurement Services Corporation AMS Technology Center 9119 Cross Park Drive Knoxville, TN 37923-4510	Wireless Sensors for Predictive Maintenance of Rotating Equipment in DOE's Research Reactors
Summary This project will result in marketable technologies to optimize the operational safety and economy of Department of Energy's research reactors. This will be achieved through implementing advanced technologies for the maintenance of rotating equipment.	

STTR Project	Title
Company Cryogenic Applications F, Inc. 450 Bacon Springs Lane Clinton, TN 37716-5311	Development and neutronic Validation of Pelletized Cold and Very Cold Moderators for Pulsed Neutron Sources
Summary The Spallation Neutron Source produces intense beams of cold neutrons for scientific research. The proposed research will lead to a more efficient beam line component which could double the output of cold neutrons at a few percent of the original cost.	

Company	Title
Information International Associates, Inc. 1055 Commerce Park Drive Suite 110 Oak Ridge, TN 37831-4219	Interactive Peer-to-Peer Scientific Communication in the Digital Library Environment
Summary There is a need for DOE scientists conducting similar research to be able to identify each other and to quickly collaborate on ideas. This research explores the concept of using Web 2.0 or social networking technologies in an electronic scientific library environment to facilitate these activities.	

Company	Title
Phds Co. 777 Emory Valley Road Suite B Oak Ridge, TN 37830-7048	High-Purity Germanium Crystals for Low Background Counting Arrays
Summary The Department of Energy Office of Nuclear Physics has a fundamental need for more sensitive, reliable, and cost effective instruments for large detector arrays for rare particle detection. The germanium crystals being developed will provide the basis for these detectors.	

Company	Title
Renewable Algal Energy, LLC 225 Rosehaven Court Kingsport, TN 37663-3427	Algal Biodiesel via Innovative Harvesting and Aquaculture Systems
Summary The production of biofuel from algae is one of the most promising new renewable fuel alternatives but research is needed to lower the cost of the process. New and improved methods for algae aquaculture and harvesting will be optimized and operated continuously in order to better estimate full-scale economics.	

TEXAS

Company	Title
Applied Nanotech, Inc. 3006 Longhorn Blvd. Suite 107 Austin, TX 78758-7631	Non-Contact, Printable Metallic Inks for Silicon Solar Cells

Summary

Electrical contacts are a critical part of photovoltaic technology and in particular represent a difficult and costly area for silicon solar cell production. The proposed research will exploit recent advances in nanotechnology to lower production costs for silicon solar cells by developing conductive inks that can be applied using non-contact printing techniques.

Company

Lynnntech, Inc.
7610 Eastmark Drive
College Station, TX 77840-4023

Title

Improved Heterogeneous Catalyst for the Production of Biodiesel

Summary

This project will develop a new catalyst to cost-effectively transform renewable sources of energy such as plant oils to biodiesel. The development of this technology will reduce the country's dependence on foreign oil and result in a net decrease in carbon dioxide emissions.

Company

Lynnntech, Inc.
7610 Eastmark Drive
College Station, TX 77840-4023

Title

Non-thermal Plasma Cracking of Residual Distillate and Vacuum Gas Oil

Summary

Heavy crude oil is becoming increasingly important as supplies of light crude run out. However, processing of heavy crude is limited to large scale refineries. This project will allow cost effective refining of heavy crude in the Nation's small refineries, which are critical to meeting the Nation's liquid fuel supply.

Company

Nanohmics, Inc.
6201 E. Oltorf Street #400
Austin, TX 78741

Title

High Temperature, High Energy Density Film Capacitors

Summary

This project will improve the performance of current capacitors by allowing them to operate at higher temperatures and higher voltages in smaller volume current capacitors. Improvements in capacitors will, in turn, reduce the size of many military and commercial electronic systems.

Company

Proportional Technologies, Inc.
8022 El Rio Street
Houston, TX 77054-4184

Title

High Rate Large Area Enriched Boron Neutron Detector for SNS

Summary

The Spallation Neutron Source (SNS) facility will push available thermal neutron flux at least an order of magnitude and drastically improve neutron scattering capabilities but high neutron flux intensity places severe demands on imaging instrumentation and many target stations have no acceptable detector selection. A novel detector technology based on boron coated straw detectors and economical methods of manufacturing will be developed providing a solution to this problem as well as to the problem of large scale deployment of neutron detection portal monitors to make our nation safer from the terrorist threat imposed by smuggling of plutonium.

Company

Shear Form, Inc.
207 Dellwood St.
Bryan, TX 77801-2520

Title

Manufacture of Fine-Grained Niobium Bar

Summary

Decreases in the starting grain size of bulk Nb for production of high-current fine-filament Nb₃Sn superconductors will be achieved by an innovative and cost effective materials processing method. The result will be lower cost Nb₃Sn superconductor wire with improved performance in high magnetic fields. With this improved Nb bar, it will be possible to manufacture higher field magnets for high energy physics applications such as particle accelerators.

Company Silicon Audio, LLC 2124 East 6th Street, Suite 105 Austin, TX 78702	Title Micro-Seismometers via Advanced Meso-Scale Fabrication
Summary This project will develop a state-of-the-art miniature seismometer to address nuclear explosion monitoring needs of the DOE/NNSA. The technology combines optical elements with small mechanical components micro-fabricated on silicon.	

Company Trimeric Corporation P.O. Box 826 Buda, TX 78610	Title Selenium Speciation and Control Technologies in Sulfate-Rich Wet FGD Systems
Summary This research will develop new technology to reduce selenium water discharges from coal-fired electric power plants and to reduce selenium environmental releases from power plant byproducts. The public will benefit from reduced exposure to selenium from the use of an abundant domestic energy source.	

UTAH

Company Combustion Resources, Inc. 1453 West 820 North Provo, UT 84601-1343	Title Demonstration of Advanced Technology for Surface Processing of Oil Shale
Summary Clean, economic development of vast western oil shale reserves can supplement unreliable, costly imported petroleum and improve national security. Proposed work will demonstrate, at pilot plant scale, a patent-pending oil shale process offering near zero carbon dioxide emissions and low water usage, while utilizing inexpensive hydrogen to upgrade shale oil. Work includes plans for process scale-up and commercial application.	

Company Materials and Systems Research, Inc. 5395 West 700 South Salt Lake City, UT 84104-4403	Title Advanced Coal Research - Sealing Systems for High Temperature SOFC
Summary This project will provide a viable sealing option for planar solid oxide fuel cells providing an impetus to commercialization of these green and energy efficient power sources.	

Company Materials and Systems Research, Inc. 5395 West 700 South Salt Lake City, UT 84104-4403	Title Development of a Thermally and Electrically Self- Sustaining Hydrogen Generation System Directly Using Petcoke
Summary This project provides a technical and economic means for in-situ hydrogen production directly using a locally available opportunity fuel for petroleum refinery applications.	

Company Vistrails, Inc. 220 Chase Street Salt Lake City, UT 84113	Title Provenance-Enabling DOE Visualization Applications
Summary This proposal will develop the framework to capture and manage all the steps that are taken by a user interacting with existing scientific visualization systems. The result will be a complete audit trail of the computational processes that are required to reproduce an image or discovery.	

VIRGINIA

Company	Title
Fm Technologies, Inc. 4431-H Brookfield Corporate Dr Chantilly, VA 20151-1691	Micro-Pulse Amplified Electron Injector
Summary This program will develop a radio-frequency accelerator that will provide a high power source suitable for many applications. Of particular importance are medical cancer therapy linacs, sterilization, and research injectors.	

Company	Title
Directed Technologies, Inc. 3601 Wilson Blvd. Suite 650 Arlington, VA 22201-2366	Aqueous Phase Base-Facilitated-Reforming (BFR) of Renewable Fuels
Summary This project investigates a novel low cost method of producing gaseous hydrogen from biomass or municipal solid waste (MSW). The process utilizes an aqueous phase Base-Facilitated-Reforming (BFR) reactor to produce pure hydrogen gas without additional purification and, in one configuration, sequester carbon in solid form to avoid release of greenhouse gases.	

Company	Title
Harmonia, Inc. 202 Kraft Drive, Suite 1000 Blacksburg, VA 24060-6747	Codebook: Accelerating Transformations in How the World Does Science Through Collaboration, Social Networking, and Semantic Analysis to Maintain and Support Computational Software
Summary This effort will accelerate and facilitate the production of scientific simulation data in an era of dramatically increased processing speeds. This project will develop approaches to scale mathematical tools and libraries to be accessible at the new computing speeds.	

Company	Title
Hyperv Technologies Corporation 13935 Willard Road Chantilly, VA 20151-2936	MiniRailguns for Fusion and HEDP
Summary This research project will demonstrate use of high velocity plasma jets to generate high density drivers suitable for imploding a plasma target to fusion relevant densities and temperatures. This technique could play a significant role in accelerating development of fusion power.	

STTR Project	Title
Company Luna Innovations Incorporated 1 Riverside Circle, Suite 400 Roanoke, VA 24016-4962	Low Draft Temperature Sensor Gen-IV Simulation Test Planning and Hardware Development
Summary A method of testing and improving the durability of low-drift temperature sensors is proposed for nuclear reactor use which supports the Gen-IV and Nuclear Hydrogen Initiatives. This sensor will enable safe operation of these new reactors at peak efficiencies, which in turn will reduce the U.S. dependency on foreign oil while simultaneously reducing emission of greenhouse gasses.	

Company	Title
Suganit Systems Inc 10903 Hunt Club Road Reston, VA 20190-3912	Feasibility of Commercialization of a Pre-Pretreatment Process for Enhanced Biomass Saccharification

Summary

Pretreatment of biomass plays a critical role in the ability to convert cellulosic biomass to fuels and chemicals. This project addresses the development of a pretreatment technique that has allowed successful production of ethanol and other chemicals from biomass.

WASHINGTON**Company**

Hummingbird Precision Machine Inc.
3340 Windolph Lane NW
Olympia, WA 98502-3837

Title

Nanoscale imaging of solid-state energy conversion processes at the solid-liquid interface using real time transmission electron microscopy

Summary

Currently, direct observation in real-time of microscopic electrochemical processes for the creation and storage of energy is hindered by limitations of current specimen holders for electron microscopes. This project proposes to develop and commercialize a prototype fluid specimen holder to give researchers radically improved methods for studying energy for better understanding of energy generation and storage processes at the molecular scale. This in turn should facilitate micro-miniaturization of current energy devices such as batteries and fuel cells, as well as the discovery of alternative energy sources.

Company

Innovatek, Inc.
350 Hills Street, Suite 104
Richland, WA 99354-5511

Title

Power Generation from an Integrated Biofuel Reformer and Solid Oxide Fuel Cell

Summary

To help meet America's needs for improved energy security and reduced environmental impacts this project will develop technology for distributed energy generation from renewable sources using its proprietary steam reforming process with a solid oxide fuel cell for localized power generation from wood saw dust. Two public goals—environmental quality, especially the reduction of greenhouse gas emissions, and energy security—provide the policy foundation for a renewable-based energy system and the proposed technology.

Company

Vista Clara Inc.
2615 W Casino Road, Suite 4-JK
Everett, WA 98204-2124

Title

Surface NMR Instrumentation and Analysis Methods for Characterizing Vadose Zone Hydrology

Summary

This project will develop a new magnetic resonance imaging instrument and analysis techniques to image and characterize groundwater and contaminant transport properties in the near subsurface. The technology developed through this program will be widely applicable to investigation and remediation of underground contamination and contaminated aquifers, groundwater resource development, and groundwater resource management.