

SBIR/STTR Fiscal Year 2012 Phase II Awards

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TOPIC: 100 GigE Networking Components

Company:

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

Project Title:

Bro-Intelligent Load Balancer Towards Terabit-Scale Cyber-Security

Project Summary:

Network-based infrastructures, while critical to ensure the productivity of our private and public organizations, are threatened by an increasing number of ever more sophisticated cyber- attacks To protect them from these cyber-threats, we are developing a new cyber-security defense system that will be able to support terabit per second traffic rates.

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TOPIC: Accelerator Technology for the International Linear Collider

Company:

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Project Title:

10 MW Annular Beam Klystron for Accelerators

Project Summary:

This project will develop a 10 MW, 1.3 GHz annular beam klystron (ABK). The advanced design of the ABK will reduce system costs below that for systems using conventional klystrons The ABK will be useful for research and medical accelerators, and other DoD and commercial applications.

Company:

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

Project Title:

High Power Rf Testing Of A 3-Cell Superconducting Traveling Wave Accelerating Structure

Project Summary:

This project will design and demonstrate a prototype of a new kind of superconducting particle accelerator. This device could significantly reduce the cost of the International Linear Collider

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TOPIC: Advanced Coal Research**Company:**

Materials And Systems Research, Inc.
5395 West 700 South
Salt Lake City, UT 84104-4403

Project Title:

Solid Oxide Fuel Cell Cathode Enhancement Through a Vacuum-Assisted Infiltration Technique

Project Summary:

This project provides a viable means for SOFC performance enhancement that furnishes an impetus to commercialization of these highly-efficient environmentally-benign power generation technologies.

Company:

Mesoscribe Technologies, Inc.
7 Flowerfield, Suite 28
Saint James, NY 11780-1514

Project Title:

Self-Powered Wireless Sensors for Gas Turbine Power Systems

Project Summary:

This project will develop self-powered wireless sensors for condition monitoring of industrial gas turbines by integrating novel high temperature Direct Write sensor technologies with power harvesting modules and industrial wireless transmitters. The technology will improve turbine efficiency, prevent forced shutdowns, and reduce operational and sustainment costs.

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TOPIC: Advanced Concepts and Technology for High Energy Accelerators**Company:**

Arbor Photonics, Inc.
251 Jackson Plaza Unit A1
Ann Arbor, MI 48103-1955

Project Title:

Fiber-laser Array Pumped OPCPA Laser-Plasma Accelerator Driver

Project Summary:

A novel laser system makes compact, tabletop-sized accelerators more realistic, and can dramatically increase the rate of acceleration possible with traditional high energy particle accelerators with dramatic decreases in machine dimensions, all the while putting the cost within reach of a range of university labs and industry.

Company:

Far-tech, Inc.
10350 Science Center Drive Suite 150
San Diego, CA 92121-1136

Project Title:

Rapidly Tunable RF Cavity for Accelerators

Project Summary:

An innovative accelerating structure is being developed for use in high intensity fixed-field alternate gradient accelerators to be used for basic physics research, industrial, accelerator driven subcritical nuclear reactor, and medical cancer therapy applications.

Company:

Fm Technologies, Inc.
4431-H Brookfield Corporate Dr
Chantilly, VA 20151-1691

Project Title:

X-Band Bunched Electron Injector

Project Summary:

This program will develop a high efficiency radio-frequency accelerator and high frequency klystron that will provide a high power source suitable for many applications. Of particular importance are medical cancer therapy linacs, sterilization and research injectors. Both accelerators and klystron sources will be more compact, more energy efficient, last longer, and provide improved cancer therapy treatment.

Company:

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

Project Title:

Helical Muon Beam Cooling Channel Engineering Design

Project Summary:

A novel system of superconducting magnets and RF cavities will reduce the size of muon beams for muon colliders, to regain the energy frontier, and for a range of applications in discovery science, energy production, homeland defense, and material science.

TOPIC: Advanced Concepts and Technology for High Intensity Accelerators

Company:

Green Mountain Radio Research Company
77 Vermont Avenue
Colchester, VT 05446-3121

Project Title:

Topic 60c - High-efficiency power amplifiers for Project X, Phase II

Project Summary:

This project will develop a high-efficiency power amplifier that is adaptable to many applications and will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

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TOPIC: Advanced Cooling And Waste Heat Recovery Technologies

Company:

Architectural Applications LLC
4109 NE Davis Street
Portland, OR 97232-3444

Project Title:

Building-Integrated Heat and Moisture Exchange-Engineering Development and Field Demonstration

Project Summary:

This technology is a large-scale, membrane-based heat and moisture exchanger that works efficiently by virtue of its large scale. The large size is accommodated by integrating it into the building wall systems, where it provides additional benefit as a highly improved insulator.

Company:

Innosense, LLC
2531 West 237th Street SUITE 127
Torrance, CA 90505

Project Title:

Aerogel Impregnated Polyurethane Piping and Duct Insulation

Project Summary:

This project will develop an eco-friendly product, InsuGel, which will serve a growing market that focuses on energy-saving construction and renovation methods. InsuGel is compliant with the mission of the "Building America" program delivering building retrofit measures to assist in improving efficiency of existing

homes.

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TOPIC: Advanced Fossil Energy Research

Company:

Makel Engineering, Inc.
1585 Marauder Street
Chico, CA 95973-9064

Project Title:

Integral Packaging of High Temperature Sensors for In-Situ Measurements

Project Summary:

Novel sensor materials are being developed for the detection of gas species in harsh environment These materials enable enhanced process control of advanced power generation systems, such as coal gasification and turbines Process control enables increased efficiency and reduced emissions.

Company:

Questek Innovations LLC
1820 Ridge Avenue
Evanston, IL 60201-3621

Project Title:

Computational Design of Weldable High-Cr Ferritic Steel

Project Summary:

Higher operating temperatures at coal-fired power plants can increase efficiency and reduce CO2 emission while also enhancing national security, domestic employment, balance of trade and U.S. GDP. This SBIR program will utilize a fundamental computational Materials by Design® approach to design and develop improved, weldable alloys to enable high efficiency power plants.

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TOPIC: Advanced Separations Chemistry Tools

Company:

Microchem Solutions
212 Tisbury Road
Norman, OK 73071-7178

Project Title:

High Pressure Open Channel Electroosmotic Pump

Project Summary:

Miniaturized high-pressure liquid chromatography (HPLC) has a wide range of applications. A problem toward miniaturized HPLC is the lack of a high-pressure micropump. In this project, we will develop a high-pressure micropump to address this problem.

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TOPIC: Advanced Sources for Accelerator Facilities**Company:**

Hyper Tech Research, Inc
539 Industrial Mile Road
Columbus, OH 43228-2412

Project Title:

Nb3Sn Wound Superconducting Undulators for Synchrotron Light Sources

Project Summary:

The research is directed towards the development of improved superconducting undulators, the devices that convert the energy of a dedicated synchrotron's electron beam into short wavelength light or x-rays. The research will lead to the emergence of improved light (or 'photon') sources for use in materials research, industry, and medicine. For example, this includes the processing of semiconductor chips for computers, determining the age of materials through radiocarbon dating, sterilizing medical equipment and food products and the diagnosing and treatment of cancer.

Company:

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

Project Title:

Praseodymium Undulator with Textured Dysprosium Poles for Compact X-ray FEL Applications

Project Summary:

Synchrotron radiation light source facilities provide critical capability to material science, chemistry, structural biology, pharmaceutical research and medicine. In this project a novel magnetic device is proposed to significantly enhance the performance of existing and future light sources.

Company:

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

Project Title:

Software for Modeling and Design of Robust GaAs Photocathodes

Project Summary:

Novel high-current, high-brightness, low emittance electron sources are required for free electron lasers, major upgrades of X-ray light source and particle accelerator facilities in the portfolio of the Department of Energy to enable the development of new energy efficient, medical, and military technologies High-fidelity software is being developed with new capabilities to design photocathodes for modern applications.

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TOPIC: Advanced Technologies for Nuclear Energy

Company:

Analysis And Measurement Services Corporation
9119 Cross Park Drive
Knoxville, TN 37923-4505

Project Title:

Rod Control System On-Line Condition Monitoring and Advanced Diagnostics for Existing and Next Generation Nuclear Power Plants

Project Summary:

This project offers to enhance the rod control systems of nuclear reactors with diagnostic capabilities to provide continuous monitoring and automated system health assessment This technology can prevent unplanned reactor trips and shorten refueling outage times which will help provide safe and reliable power to the general public.

Company:

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

Project Title:

Non-contact, High Speed Inspection of Zirconium Power Plant Components

Project Summary:

This project will develop new, deeply penetrating solid-state sensor arrays for through wall inspection of nuclear power plant components.

Company:

Sporian Microsystems, Inc.
515 Courtney Way Suite B
Lafayette, CO 80026-8821

Project Title:

Advanced SiCN Materials and Sensors for Generation IV Reactors

Project Summary:

A novel high temperature ceramic material and sensing technology is proposed to support the design and safe operation of Generation IV nuclear power systems.

TOPIC: Advanced Technology Applications for Buildings

Company:

Mechanical Solutions, Inc.
11 Apollo Drive
Whippany, NJ 07981-1423

Project Title:

Supercharger for Heat Pumps in Cold Climates

Project Summary:

This project will enable existing and new design heat pump-based heating systems to efficiently operate at sub-zero temperatures This will save energy and extend heat pump use to regions cold climates and those without gas or oil.

Company:

Soraa, Inc.
6500 Kaiser Drive
Fremont, CA 94555-3613

Project Title:

Large-Area Semipolar Ammonothermal GaN Substrates for High-Power LEDs

Project Summary:

This project will develop disruptive substrate technology for gallium nitride based light emitting diodes (LEDs) to improve performance and reduce costs. The new technology could revolutionize solid state lighting and lead to enormous energy savings.

TOPIC: Advanced Water Power Technology Development

Company:

Oscilla Power, Inc.
419 Wakara Way Suite 207C
Salt Lake City, UT 84108-3506

Project Title:

Reliability Enhancement and Preliminary Ocean Demonstration of Low Cost Wave Energy Harvester

Project Summary:

Ocean wave energy has remained uneconomical due to the high capital costs and low reliability of conventional technologies. In this project, a prototype of a breakthrough no-moving-parts technology that

uses novel, domestically available materials to produce low cost, utility-scale electricity will be designed, built and demonstrated in the open ocean.

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TOPIC: Ancillary Technologies for Accelerator Facilities

Company:

Advalue Photonics Inc
3708 E. Columbia Street, Suite 100
Tucson, AZ 85714-3413

Project Title:

High Energy Sub-100 Femtosecond Fiber Lasers at 2 Micron

Project Summary:

DoE requires an ultrafast high peak power laser system for Enhanced Self-Amplified Spontaneous Emission application. AdValue Photonics proposes a high-energy 2'm femtosecond fiber CPA laser system that could deliver pulses energy as high as 5mJ and duration of sub-100 fess to meet the need.

Company:

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

Project Title:

Development of a Superconducting RF Multi-Spoke Cavity for Compact Light Sources

Project Summary:

Light source facilities require high current electron accelerators During this SBIR, Niowave, in collaboration with Old Dominion University, will develop superconducting multi-spoke cavities that offer several advantages over the existing elliptical structures used to accelerate electrons near the speed of light.

Company:

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

Project Title:

Development of a Superconducting RF 500 MHz Quarter Wave Resonator for Synchrotron Light Sources

Project Summary:

Electron-beam-driven light sources generate high energy light used in a wide variety of scientific disciplines In this SBIR, Niowave will build and test a cost-effective design for a new superconducting accelerating cavity applicable to light source projects, reducing the capital and operating costs to participate in this kind of research.

Company:

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

Project Title:

A User-Friendly, Modular Simulation Tool for Laser-Electron Beam Interactions

Project Summary:

Present accelerator simulation software is narrowly focused with very steep learning curves. We will develop a user-friendly code with an intuitive interface for experimental design and analysis.

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TOPIC: Atmospheric Measurement Technology**Company:**

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

Project Title:

Volatility and Polarity Separated (VAPS) Total Organic Aerosol using Thermal Desorption Modulated Chromatography

Project Summary:

Small airborne particles generated from energy-related activities can adversely impact global climate, human health, and visibility. Atmospheric aerosol particles are known to contain a large fraction of organic components. We propose to 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 atmospheric particulate matter.

Company:

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

Project Title:

High Sensitivity HNO₃ Monitor using Continuous Wave Quantum Cascade Laser IR Absorption

Project Summary:

Improved measurement techniques for atmospheric gas phase nitric acid are needed to better understand global climate change because nitric acid affects cloud formation. This novel instrument for nitric acid detection can be used to elucidate cloud condensation, droplet activation, and nitrate aerosol processes in the atmosphere.

Company:

Aerodyne Research, Inc.
45 Manning Road

Billerica, MA 01821-3976

Project Title:

Expanded Wavelength CAPS-Based Particle SSA Monitor

Project Summary:

Ambient atmospheric aerosols generated through human activities can exert an influence on the earth's radiation budget (and thus the 'greenhouse effect') comparable in magnitude with greenhouse gases such as carbon dioxide and methane. This device will enable scientist to measure critical optical properties of such aerosols in a routine fashion in order to provide better predictions of climate change.

Company:

Aerosol Dynamics Inc.
935 Grayson Street
Berkeley, CA 94710-2640

Project Title:

Aerosol Mobility Imaging for Rapid Size Distribution Measurement

Project Summary:

Airborne particles, many of them originating from energy-related activities, adversely affect climate, human health and visibility. These effects depend on the particle size. An instrument will be developed for rapid measurement of these sized particles, with wide-ranging applications to research and industry.

Company:

Spec Incorporated
3022 Sterling Circle Suite 200
Boulder, CO 80301-2377

Project Title:

Tethered Balloon Systems for Arctic Measurements in the Near-Surface Atmosphere

Project Summary:

Long-term measurements in Arctic stratus clouds are needed to improve climate prediction models. The Arctic is a region which is warming at twice the rate of the global average is thought to be a harbinger of global warming. A second-generation tethered balloon system with sophisticated sensors for measuring Arctic cloud properties will be built and deployed to the DOE site at Oliktok Point, Alaska. The demonstration field project will show proof-of-concept for collecting long-term data in Arctic stratus clouds.

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TOPIC: Carbon Cycle Measurements of the Atmosphere and the Biosphere

Company:

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

Project Title:

Quantum Cascade Laser System for Simultaneous Measurements of ^{13}CO and C^{18}O Carbon Monoxide Isotopologues

Project Summary:

Carbon monoxide (CO) is an atmospheric trace gas with an important role in atmospheric chemistry and global change. This project will produce a laser based isotopic carbon monoxide monitor to quantify sources of atmospheric CO based on their distinct isotopic signatures to assess their impact on the atmosphere and climate change.

Company:

Los Gatos Research
67 East Evelyn Avenue Suite 3
Mountain View, CA 94041-1518

Project Title:

Isotopic Carbon Dioxide Analyzer for Flux Measurements

Project Summary:

This project will develop a novel instrument based on a new laser technology called Off-Axis ICOS to measure carbon dioxide with unprecedented speed, accuracy and precision. The instrument may be applied for environmental studies of the carbon cycle, medical diagnostics for disease detection, and industrial monitoring.

Company:

Vista Photonics, Inc.
3 N. Chamisa Drive, Suite 1
Santa Fe, NM 87508-9463

Project Title:

Fully Integrated Low-Cost High-Precision Carbon Dioxide Analyzer

Project Summary:

Inexpensive high-performance carbon dioxide sensors are required in the field to understand global warming. The proposed laser sensor technology will provide the required measurements for an exceptional value.

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TOPIC: Climate Control Technologies for Fossil Energy Applications**Company:**

Green Technology Ltd Co.
3903 Spring Valley Way
Louisville, KY 40241

Project Title:

A Contaminant Tolerant Solvent/Stripping Chemical Hybrid Process for Carbon Capture in Existing Coal-Fired Power Plants

Project Summary:

This project is to develop a novel solvent technology to reduce CO2 emissions at existing coal-fired power plants by at least 90%.

Company:

Sustainable Innovations, LLC
160 Oak Street Unit 412
Glastonbury, CT 06033-2336

Project Title:

Electrochemical Polymer Precursor Generation (EPPG)

Project Summary:

This project is focused on the development of technology that electrochemically transforms waste carbon dioxide into commodity chemicals that are critical to the manufacture of polymers and durable goods. When coupled with renewables, this technology forms the basis of a carbon-negative, efficient, industrially scalable system

Company:

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

Project Title:

A Novel Sorbent to Reduce CO2 Emissions from Existing Coal-Fired Power Plants

Project Summary:

This project will develop a new low cost material to effectively remove CO2 from the effluents of existing coal-fired power plants This process is a highly efficient and environmentally responsible way to generate electricity without emitting greenhouse gases and to overcome the economic and environmental problems that limit the full utilization of coal

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TOPIC: Collaboration, Scientific Visualization and Data Understanding**Company:**

Power Info LLC
18819 36th Dr SE
Bothell, WA 98012-8843

Project Title:

A Data-Driven Approach to Interactive Visualization of Power Grids

Project Summary:

This project will develop a real-time visualization tool to help power grid operators perform mission-critical tasks. Combining decision-supporting analysis with data-driven visualization, the proposed tool is designed to assist operators to perceptually monitor a large number of events, identify harmful threats to grid, and suggest courses of action.

Company:

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

Project Title:

Visualizing Staggered Vector Fields

Project Summary:

Visualization artifacts due to the misplacement of electromagnetic in computer simulations carry a cost in accuracy and lost productivity. We will remedy this problem by extending the leading, DOE-funded, visualization tool VisIt and by developing a commercial product (PerceptEM), which will satisfy the needs of the electromagnetic modeling community.

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Topic: Data Management and Storage**Company:**

Antek Peripherals Inc.
21451 Continental Circle
Saratoga, CA 95070-6505

Project Title:

Significantly Enhance Hard Disk Drive Performance by Using Titanium Foil Disk Substrates

Project Summary:

The Internet, computing and data storage are a large part of our daily lives as these enable social networking, communication, business, entertainment and Government. Research done in this project will allow the popular hard disk drive to store more data, transfer it faster, and consume significantly less energy.

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Topic: Energy Efficient Membranes for Industrial Applications**Company:**

Aspen Products Group, Inc.
184 Cedar Hill St.
Marlborough, MA 01752-3017

Project Title:

High Permeance Hybrid Membranes for CO2 Separation

Project Summary:

The capability to efficiently remove carbon dioxide from gas streams is desirable for a wide variety of applications, including carbon sequestration Aspen Products Group, Inc is developing a high temperature carbon dioxide permeable membrane to separate carbon dioxide from hydrogen, water, nitrogen, oxygen, and other gases.

Company:

Bettergy Corp.
8 John Walsh Blvd., Suite 321
Peekskill, NY 10566-5347

Project Title:

A Novel Composite Membrane for High Temperature Hydrogen Separation

Project Summary:

Successful completion of this program will make significant contribution toward gaining our nation's energy independence through developing key technologies for the new hydrogen economy. It will also create a new vibrant industry and generate a tremendous amount of new, highly skilled job opportunities for the United States.

Company:

Media And Process Technology Inc
1155 William Pitt Way
Pittsburgh, PA 15238-1368

Project Title:

An Industrial Membrane System Suitable for Distributed Used Oil Re-Refining

Project Summary:

This waste oil re-refining technology can be used to produce high quality lubricant from waste oils thereby reducing crude oil imports, reducing air pollution and GHG emission, and creating new jobs.

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TOPIC: Enhanced Availability of Climate Model Output**Company:**

Kitware Inc.
28 Corporate Drive
Clifton Park, NY 12065-8688

Project Title:

Climate Pipes: User-Friendly Data Access, Data Manipulation, Data Analysis and Visualization of Community Climate Models

Project Summary:

The proposed work provides non-researchers simple access to and analysis tools for computer model output resulting from high-resolution, long-term, climate change projections performed as part of the U.S. Global Change Research Program.

Company:

Vertum Partners LP
2400 Beverly Blvd
Los Angeles, CA 90057-1002

Project Title:

Assessing Climate Change Effects on Wind Energy Phase II

Project Summary:

This project will develop a software tool that will quantify and reduce the uncertainties of atmospheric factors in wind energy production. This will allow wind farm project analysts and risk assessors the ability to lower costs of wind energy production and plan for the benefits and risks of a changing climate.

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TOPIC: Flywheel Energy Storage**Company:**

Beacon Power Corporation
65 Middlesex Road
Tyngsboro, MA 01879-2041

Project Title:

Development of a High-power Motor/Generator for the ARPA-E Hub-Less Flywheel

Project Summary:

ARPA-E is funding development of the critical components for a low-cost energy storage flywheel for firming of renewables. The power capability must be increased for this flywheel to be applicable to grid applications like frequency regulation. This SBIR project will develop both material and configuration improvements to allow a four-times increase in power capacity.

Company:

Calnetix Technologies, LLC
23695 Via Del Rio
Yorba Linda, CA 92887-2715

Project Title:

Shaft-less, Hub-less High Strength Steel Flywheel

Project Summary:

This cost effective flywheel system provides (1) boost power to maintain frequency regulation for blackout prevention (2) temporary large scale energy storage at solar or wind farms to store energy that can be

transmitted during times of increased demand, or (3) for ramping power to prevent grid impact as renewable source output varies.

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TOPIC: Fusion Science and Technology

Company:

Calabazas Creek Research, Inc.
690 Port Drive
San Mateo, CA 94404-1010

Project Title:

Advanced Output Coupling for High Power Gyrotrons

Project Summary:

Successful development of a direct coupler and broad band, high power window will enable more efficient operation of fusion research devices while saving approximately \$500,000 for each gyrotron installation. It would establish the U.S as the leader in high power gyrotron technology.

Company:

Eagle Harbor Technologies, Inc.
119 West Denny Way Suite M210
Seattle, WA 98119-4205

Project Title:

High Gain and Frequency Ultra-Stable Integrators for ICC and Long Pulse ITER Applications

Project Summary:

The proposed work seeks to develop an ultra-stable long pulse integrator for the fusion energy community.

Company:

Lodestar Research Corporation
2400 Central Ave P-5
Boulder, CO 80301-2843

Project Title:

ArbiTER: A Flexible Eigenvalue Solver for Edge Fusion Plasma Applications

Project Summary:

A computer program is proposed to assist in testing other simulation codes used in fusion research This program is designed to be flexible enough to be applied to a wide variety of such codes, thus saving programming effort compared to codes that simulate a single physics model.

Company:

Virginia Diodes, Inc.
979 Second Street SE
Charlottesville, VA 22902-6172

Project Title:

Robust and Reliable Receivers for the ITER ECE System

Project Summary:

This project will develop new technologies that are critical for the US contribution to the multi-billion dollar international ITER experiment; which will show that fusion can be used to generate useful electrical power. VDI unique millimeter-wave and terahertz technology will be extended to supply a high frequency receiver system that is required for the ITER diagnostic instruments .

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TOPIC: Genomic Science and Related Biotechnologies**Company:**

Namesforlife, LLC
325 Grand River, Suite 300
East Lansing, MI 48823-4324

Project Title:

The NamesforLife Semantic Index of Phenotypic and Genotypic Data for Systems Biology

Project Summary:

This project will develop a novel technology that resolves uncertainty about the meaning of biological names or other dynamic terminologies. It uses those terms to create persistent links to related information, goods, and services available on the Internet, even if the terms have changed.

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TOPIC: Global Nuclear Safeguards Research and Development**Company:**

Dirac Solutions Inc.
6773 Sierra Ct., Suite C
Dublin, CA 94568-2650

Project Title:

Ultra-secure RF Tags for Safeguards and Security

Project Summary:

This project builds on the work of the DOE national laboratories to develop UHF and Ultra-wideband (UWB) RFID tags for safeguards and security needs in the DOE and other agencies The resulting tags will be reliable, perform in harsh environments, and incorporate sophisticated security features.

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TOPIC: High Energy Density Plasmas and Inertial Fusion Energy

Company:

nLight Photonics Corporation
5408 NE 88th Street, Bldg E
Vancouver, WA 98665-0990

Project Title:

High Efficiency kW-Class Semiconductor Laser Bars for Inertial Fusion Energy

Project Summary:

The current state-of-the-art performance and cost of semiconductor lasers is insufficient to meet the needs of making laser inertial fusion energy commercially viable nLight proposes novel designs of high-power semiconductor lasers to significantly improve price, power, efficiency, and reliability as an essential step towards making fusion energy a practical reality.

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TOPIC: High Energy Physics Computer Technology

Company:

Semantic Designs Inc.
13171 Pond Springs Road
Austin, TX 78729-7102

Project Title:

Refactor++: Automated Support for Program Enhancements

Project Summary:

Scientific understanding of physics, drugs, biochemistry, and also engineering, is held back by the inability of scientists and engineers to organize the millions of lines of code that supercomputers will run for continuing experimentation. This work will harness automated programming methods and supercomputing itself to enable users to reshape their C++ software into more pliable forms.

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TOPIC: High Performance Computing Systems

Company:

Accellogic, LLC
13680 NW 14TH STREET, SUITE 5
Sunrise, FL 33323-2845

Project Title:

Extreme-Speed Eigensolver Suite

Project Summary:

To pursue DOE's scientific priorities, quantum increases in large- scale computing and simulation/modeling speeds are needed. The project goal is to develop breakthrough, low-cost technology that reduces computational times from months to hours or days to seconds, thus revolutionizing entire industrial design cycles and the way we do science in general.

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TOPIC: High-Field Superconductor and Superconducting Magnet Technologies for High Energy Particle Colliders**Company:**

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

Project Title:

Fiber Optic Quench Detection Via Optimized Rayleigh Scattering in High-field YBCO Accelerator Magnets

Project Summary:

Coated conductors offer the potential of generating the highest magnetic fields possible with superconducting materials. A new approach to protecting YBCO magnets is essential and will be investigated here.

Company:

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

Project Title:

Tantalum Tube for Diffusion Barriers

Project Summary:

Increased deformability and uniformity in Ta tube used in Nb₃Sn superconducting wire will be achieved by an improved materials processing method to refine the microstructure in conductor components. The improved microstructure will be produced in Ta tube by a severe plastic deformation processing method to reduce the average grain size, improve microstructural uniformity, and heal seam-welds, improve material ductility, improve Nb₃Sn wire fabrication yield and lower Nb₃Sn wire manufacturing costs, and enable improved Nb₃Sn superconductor performance (higher current carrying capacity in higher magnetic fields).

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TOPIC: High-Speed Electronic Instrumentation for Data Acquisition and Processing

Company:

Ridgetop Group, Inc.
3580 West Ina Road
Tucson, AZ 85741-2276

Project Title:

Radiation-Hardened Low-Power ADC for Particle Detectors

Project Summary:

Particle detectors for nuclear physics and high energy physics experiments require highly accurate and sensitive radiation hardened digitizers for read-out electronics. This program meets those needs through design and fabrication of a high performance, highly integrated, very low power chip that reduces the cost of the next generation of detectors.

Company:

Voxtel, Inc.
15985 NW Schendel Avenue
Beaverton, OR 97006-6703

Project Title:

Wafer-Scale Geiger-mode Silicon Photomultiplier Arrays Fabricated Using Domestic CMOS Fab

Project Summary:

A single-photon-sensitive detector technology, manufactured using domestic CMOS suppliers, will be made available to system developers using 3D circuit stacking technology to configure high-performance detector arrays.

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TOPIC: Hydrogen and Fuel Cells**Company:**

Applied Nanotech, Inc.
3006 Longhorn Blvd, Ste 107
Austin, TX 78758-

Project Title:

Ultra Lightweight High Pressure Hydrogen Fuel Tanks Reinforced with Carbon Nanotubes

Project Summary:

Carbon fiber is very expensive, ranging from \$20-\$50 per kilogram. This work will develop technologies that will reduce the dependence on carbon fiber material needed in CFRP tanks through CNT reinforcement. Using nano-reinforcement upon the composite resin matrix will result in a reduced amount of required carbon fiber for CFRP tanks while making them more light-weight and efficient.

Company:

Tetramertechologies, LLC.

657 South Mechanic Street
Pendleton, SC 29670-

Project Title:

New High Performance Water Vapor Membranes To Improve Fuel Cell Balance of Plant Efficiency and Lower Costs

Project Summary:

This project's new water vapor membrane technology will create 20 high paying jobs in South Carolina while helping the US lower its dependence on foreign oil. Already growing modestly in the US, the fuel cell commercial enterprise will be accelerated with the higher performance and lower costs targeted in Phase II.

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TOPIC: Imaging and Radiochemistry

Company:

Sofie Biosciences, Inc.
6162 Bristol Parkway
Culver City, CA 90230-6604

Project Title:

Commercialization of a Microscale, Point of Use Radiosynthesis Device for the Development and Production of PET Probes

Project Summary:

Positron Emission Tomography (PET) provides images of the biology of living systems, from microorganisms in the environment to disease pathways in patients. An affordable, compact, chip-based device to produce PET probes on-demand will enable scientists to image diverse biological systems by eliminating barriers that currently restrict probe availability and diversity.

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TOPIC: Innovative Solar Power: Lowering The Cost of Novel Photovoltaics, Solar Designs for Desalination, and Distributed Concentrating Solar Power

Company:

Xunlight 26 Solar, LLC
3145 Nebraska Ave.
Toledo, OH 43607-3102

Project Title:

Transparent, Flexible CdTe Modules for High Efficiency Tandem PV

Project Summary:

This project will make 1'x4' prototype flexible solar modules using carbon nanotubes and ultrathin semiconductor layers. The project will deliver flexible see-through solar modules, help maintain U.S. leadership in photovoltaics technology, and lower the cost of clean, renewable electricity generation.

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TOPIC: Instrumentation and Tools for Materials Research Using Neutron Scattering

Company:

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

Project Title:

Very Large Area Microchannel Plate Neutron Detectors for Neutron Scattering

Project Summary:

This project will establish a solid-state neutron imaging detector capable of fully replacing existing ^3He gas tube detectors which are now a limited national resource. This instrumentation will provide new capabilities to Oak Ridge and others, advancing US leadership in science.

Company:

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

Project Title:

Genetic Algorithm Driven Molecular Structure Determination and Visualization for Real-Time Decision Support

Project Summary:

The Genetic Algorithm Driven Decision Support System (GADDSS) will enable the real-time molecular structure determination of the leadership Spallation Neutron Source and High Flux Isotope Reactor instruments experiment samples. Working together with existing systems at the facility we are able to provide our scientists and engineers more automated experiment analysis than ever before.

Company:

Xemed, LLC
16 Strafford Avenue
Durham, NH 03824-1908

Project Title:

Polarized ^3He Circulating Technologies for Neutron Analyzers

Project Summary:

Neutron scattering advances technology for telecommunications, energy, manufacturing, plastics, transportation, and biotechnology. The newest class of wide-angle polarized neutron spectrometers requires

polarized ³He production and delivery at unprecedented rates. This project develops gas circulation technologies that deliver polarized ³He gas from a new large-capacity polarizer, sited remotely, to a wide-angle neutron analyzer.

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TOPIC: Instrumentation for Advanced Chemical Imaging

Company:

Anasys Instruments Corp
121 Gray Avenue, Suite 100
Santa Barbara, CA 93101-1809

Project Title:

High Speed Wideband Infrared nano-Spectroscopy

Project Summary:

This project will address a major unmet need in materials science and industry by developing a novel microscope platform that will enable chemical analysis at the nanoscale. This new microscope will accelerate the development of new high performance materials and will enable new scientific discoveries.

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TOPIC: Instrumentation for Electron Microscopy and Scanning Probe Microscopy

Company:

Hummingbird Precision Machine Co, Dba Hummingbird
8300 28th Ct NE, Unit 200/300
Lacey, WA 98516-7126

Project Title:

Full Pressure Range Environmental Gas Heating Holder for the Transmission Electron Microscope

Project Summary:

This project proposes to develop and commercialize an electron microscope environmental gas specimen holder to give researchers radically improved methods for studying energy materials so as to better understand energy generation and storage processes at the nanometer scale. This in turn should facilitate miniaturization of current energy devices such as batteries and fuel cells.

Company:

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

Project Title:

Novel Ultrafast Electron Diffraction System

Project Summary:

The proposed 'streaked'-Ultra Electron Diffraction system (SUED) will produce innovative and groundbreaking results in many scientific areas, such as materials science, biology and chemistry. This will be possible thanks to a further improvement in the understanding of ultrafast phenomena with the SUED system.

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TOPIC: Instrumentation for Materials Research Using Ultra-Bright or Ultra-Fast X-Ray Sources**Company:**

Kapteyn-murnane Laboratories Inc.
1855 S 57th Ct
Boulder, CO 80301-2811

Project Title:

Tunable Narrow-Band High Harmonic Beamline Optimized for Ultrafast Soft X-Ray Photoemission and Imaging

Project Summary:

This project will develop a tunable, tabletop, ultrafast soft X-ray beamline that is not available commercially for the study of new materials and nano-devices. This beamline is developed by integrating an extreme ultraviolet and soft X-ray light source based on nonlinear up-conversion and a novel monochromator optimized for this light source.

Company:

Star Cryoelectronics, LLC
25 Bisbee Court, Suite A
Santa Fe, NM 87508-1338

Project Title:

Superconducting Tunnel Junction Detectors for High-Resolution X-Ray Spectroscopy

Project Summary:

Detector development for X-ray spectroscopy has lagged behind advances at the Nation's synchrotron facilities leading to constraints on productivity. This project advances the state of the art with the development of high speed and high energy resolution detectors specifically for synchrotron science applications that will enhance research capabilities and throughput.

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TOPIC: Modeling and Simulation of Industrially-Relevant Problems**Company:**

Dynaflow, Inc.
10621-J Iron Bridge Road

Jessup, MD 20790-9381

Project Title:

Multiscale Two-Phase Bubbly Flow Modeling

Project Summary:

This project will develop a computational fluid dynamics code which is able to simulate complex bubbly flows while addressing issue at all scales. This tool will benefit chemical, oil and gas, nuclear, and marine industries to improve efficiency of industry systems involving bubbly mixture flows.

Company:

Simmetrix Inc
10 Executive Park Dr.
Clifton Park, NY 12065-5630

Project Title:

Reliable Parallel Electromagnetic Simulations on High-Order Unstructured Meshes (38A)

Project Summary:

This project will provide simulation automation tools for the application of a new generation simulation technologies which represent the only viable means of reliably providing the high accuracy results needed for design of critical systems. These tools will be applied to electromagnetic design problems ranging from threat detection, to antenna design, to wireless device design, to the treatment of cancer, to billion dollar high-energy scientific accelerators.

Company:

Far-tech, Inc.
10350 Science Center Drive Suite 150
San Diego, CA 92121-1136

Project Title:

Integrated Modeling Tool for Electron-Beam Based Ion-Sources

Project Summary:

This project will develop a numerical modeling tool that will guide and optimize electron-beam based ion-sources for research and industrial applications. The tool will minimize trial and error experiments in current experiments, and help design future advanced devices, which is crucial for rare isotope ion sources that are needed in nuclear physics research, and further in medical and industrial applications.

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TOPIC: Nuclear Physics Accelerator Technology

Company:

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

Project Title:

High Radiation Environment Nuclear Fragment Separator Magnet

Project Summary:

New generations of high-temperature superconducting wire have opened up new technological possibilities for magnet coils in high radiation and high heat load environments. Large magnets to test this concept are being designed and prototyped for the Facility for Radioactive Ion Beams.

Company:

Ridgetop Group, Inc.
3580 West Ina Road
Tucson, AZ 85741-2276

Project Title:

High-Performance ADC for Particle Accelerator Instrumentation Applications

Project Summary:

The study of high-energy sub-atomic particle behavior is limited by speed, resolution, power, and radiation tolerance of components used in instruments that control accelerators. This solution addresses all these issues with a novel data converter that exceeds state-of-the-art performance for generating and controlling particle beams necessary to conduct required experiments.

Company:

Svt Associates, Inc.
7620 Executive Drive
Eden Prairie, MN 55344-3677

Project Title:

Enhanced Quantum Efficiency of Photocathodes with Polarized Emission

Project Summary:

This project seeks to advance the tools available for experimental physics research.

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TOPIC: Nuclear Physics Electronics Design and Fabrication**Company:**

Xia, LLC
31057 Genstar Road
Hayward, CA 94544-0000

Project Title:

High Density Low Cost Readout Electronics for Large Scale Radiation Detectors

Project Summary:

Development of affordable, high performance digital readout electronics is vital to support cutting- edge nuclear science research at the nation's nuclear facilities and universities. This proposed work will help maintain U.S. scientific and technological leadership role in the world, educate and train future nuclear science workforce, and improve homeland security.

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TOPIC: Nuclear Physics Instrumentation. Detection Systems and Techniques**Company:**

Integrated Sensors, LLC
2403 Evergreen Road
Ottawa Hills, OH 43606-2323

Project Title:

High-Performance Plasma Panel Based Micropattern Detector

Project Summary:

A low mass, position sensitive, fast, charged particle radiation detector is proposed for a variety of applications in nuclear physics including low to medium energy ion beam research Integrated Sensors is teamed on this project with the Physics Division at Oak Ridge National Laboratory and the Physics Department at the University of Michigan.

Company:

Phds Co.
3011 Amherst Road
Knoxville, TN 37921-3713

Project Title:

Thin-Window P-Type Point-Contact Germanium Detectors for Rare Particle Detection 45c

Project Summary:

The DOE Office of Nuclear Physics requires larger, more sensitive and lower cost detectors for rare-particle detection experiments. The new variety of germanium detectors being developed will provide a new generation of improved detectors for this critical DOE mission and for the detection of radioactive materials in general.

Company:

Sinmat Inc.
1912 NW 67th Place
Gainesville, FL 32653-1649

Project Title:

Novel Polishing Process to Fabricate Ultra Low Thickness Variation Diamond Substrates for Next Generation Beam Tracking Detectors

Project Summary:

This project will develop a novel technology to produce ultra-flat diamond crystals that may lead to

advancement in the fields of nuclear physics research, X-ray, optical, and next generation computer applications.

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TOPIC: Nuclear Physics Isotope Science and Technology

Company:

Isotherapeutics Group LLC
1004 S. Velasco
Angleton, TX 77515-5250

Project Title:

High Specific Activity Sm-153 by Post Irradiation Isotope Separation

Project Summary:

Development of promising cancer therapies is being hindered by the lack of suitable radioisotopes This project aims to demonstrate that samarium-153 can be produced in high specific activity form by electromagnetic separation Successful deployment of the technology could enable the creation of a new generation of targeted cancer therapies.

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TOPIC: Production of Bioenergy and Biofuels From Cellulosic and Non-Food Biomass

Company:

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

Project Title:

Biomass to Hydrocarbons by Catalytic Fast Pyrolysis

Project Summary:

The U.S. has a pressing need to develop technologies to convert non-food biomass resources into renewable commodities, including fuels, plastics, and specialty chemicals This work will develop technologies that target direct conversion of inedible, waste components of biomass into chemicals that can be used as additives or replacements to gasoline or to synthesize plastics.

Company:

Lygos, Inc
1534 Innes Ave.
San Francisco, CA 94124-

Project Title:

Microbial production of dicarboxylic acids

Project Summary:

This project will develop renewable routes to produce commodity and specialty chemicals currently made from petroleum. Lygos' processes can be applied domestically to convert waste agricultural material into chemicals that are predominantly manufactured abroad today

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TOPIC: Radiation Detection**Company:**

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

Project Title:

Novel Method for Growth of Detector-Grade CZT Crystals

Project Summary:

This program is focused on development of a novel method for production of semiconductor material for detection of X- and g-ray radiation with applications in homeland security inspection, medicine, nuclear science and geophysics.

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TOPIC: Radio Frequency (RF) Devices and Components for Accelerator Facilities**Company:**

Advanced Cooling Technologies, Inc.
1046 New Holland Ave
Lancaster, PA 17601-5606

Project Title:

Passivation Coatings for RF Power Devices

Project Summary:

A core technology is proposed for improved corrosion resistance in water cooled radio frequency devices. An innovative approach to deposit highly uniform ceramic coatings will significantly extend operation lifetime, thus decreasing maintenance costs and downtime of DOE accelerator facilities

Company:

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

Project Title:

Chirped Electron Bunch Energy Compensation For An X-Ray Light Source

Project Summary:

Accelerators used by DoE for nuclear-physics research require huge amounts of electrical power. The proposed grant will develop a high-efficiency power amplifier that is adaptable to many applications and will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

Company:

Green Mountain Radio Research Company
77 Vermont Avenue
Colchester, VT 05446-3121

Project Title:

High-Power High-Efficiency Power Amplifiers for Synchrotron Light Sources

Project Summary:

Accelerators used by DoE for nuclear-physics research require huge amounts of electrical power. The proposed grant will develop a high-efficiency power amplifier that is adaptable to many applications and will significantly reduce electricity consumption, thus reducing operating costs, importation of foreign petroleum, pollution, and greenhouse-gas emissions.

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TOPIC: Radio Frequency Accelerator Technology for High Energy Accelerator and Colliders

Company:

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

Project Title:

A New Conical Half-Wave Superconducting Cavity

Project Summary:

We propose to design a new kind of superconducting cavity that reduces cost by occupying less space in a proton accelerator. This device will be useful not only as a component of accelerators for basic research but also for the transmutation of nuclear waste

Company:

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

Project Title:

High Gradient Test of a Standing Wave Dielectric Loaded Accelerating Structure

Project Summary:

An ultra-high gradient (acceleration rate) is preferred for cost and other reasons in future high energy collider designs. The standing wave Dielectric Loaded Accelerating (DLA) structure proposed for this project has a unique possibility of achieving a very high gradient with a low Rf power requirement.

Company:

Strategic Polymer Sciences, Inc
200 Innovation Blvd
State College, PA 16803-6602

Project Title:

Unconventional Compact Wound Glass Capacitors for Pulsed Power System in RF Accelerators

Project Summary:

This program will develop high performance energy storage glass capacitors with ultrahigh energy density, high reliability, and low cost. The advanced capacitors can be used in military pulsed power weapon systems, medical defibrillators, hybrid electric vehicles, wind turbine, and photovoltaic panels.

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TOPIC: Remote Sensing**Company:**

Mesa Photonics, LLC
1550 Pacheco St
Santa Fe, NM 87505-3914

Project Title:

Chemical remote sensor for proliferation

Project Summary:

This project will develop an unobtrusive sensor that uses sunlight to detect possible clandestine nuclear processing. Successful completion of the Phase II project will provide a validated prototype sensor that is fully automated, compact, portable, and operates continuously at low power.

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TOPIC: Smart Facilities and Green Networks**Company:**

Cognitive Electronics LLC
16 Cavendish Ct., Suite 2F
Lebanon, NH 03766-1441

Project Title:

Power Efficient Supercomputing

Project Summary:

A novel computer system based on certain characteristics of brain circuitry has been demonstrated to perform supercomputing tasks at drastically lower power than standard datacenter servers. Additional development and testing will allow us to make it available to new users while verifying its power efficiency and preparing it for manufacturing.

Company:

Decision Detective Corporation
4354 Town Center Blvd. Suite #114-250
El Dorado Hills, CA 95762-7116

Project Title:

Power Management Optimization Platform for High Performance Computing and Data Centers

Project Summary:

Decision Detective software creates accurate and timely intelligence from monitored High Performance Computing and datacenter climate conditioning equipment that saves significant energy and lowers operational costs, all while maintaining high computing system availability and reliability.

Company:

Enhanced Systems Consulting, Inc.
3201 Hanover Road
Johnson City, TN 37604-1463

Project Title:

Dynamically Controlled Electric Demand Management System

Project Summary:

Variable electric demands force costly inefficiencies and risks to the nation's electric grid. DCEDMS is a systematic software solution that monitors and manages electricity distribution by synchronizing and balancing generation and consumption with scalable, secure and sustainable smart grid technologies.

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TOPIC: Technologies for Subsurface Characterization and Monitoring

Company:

Vista Clara Inc.
12201 Cyrus Way, Suite 104
Mukilteo, WA 98275-5735

Project Title:

Low Cost In-Situ NMR Technologies for Monitoring Biological and Geochemical Processes in the Subsurface

Project Summary:

This project will develop and demonstrate the application of low-cost in-situ NMR instrumentation and measurement techniques for monitoring bioremediation of contaminated groundwater aquifers. The proposed methodology will provide reliable, higher- resolution information on this key subsurface process for improved understanding and remediation of contaminated groundwater at DoE legacy and commercial sites

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TOPIC: Technologies Related to Energy Storage for Electric Drive Vehicles**Company:**

Onto Technology, LLC
63221 Service Road Suite 6/F
Bend, OR 97701-8740

Project Title:

Advanced Battery Recycling

Project Summary:

This project develops environmentally friendly processes for recycling batteries from portable electronics or electric vehicles. The technology developed will reduce manufacturing costs and be foundational for jobs supporting the nation's sustainability and energy independence.

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TOPIC: Technology to Support BES User Facilities**Company:**

Mesa Photonics, LLC
1550 Pacheco St
Santa Fe, NM 87505-3914

Project Title:

Complete Characterization of Ultrafast X-Ray Pulses

Project Summary:

This project will develop low-cost, high precision instruments to improve the performance of high-brightness x-ray sources. These sources can improve medical diagnostics and improve detection for Homeland Security.

Company:

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

Project Title:

Engineering a High Resolution Scintillator for Next-Generation High Frame Rate Detectors

Project Summary:

The proposed development will allow the utilization of the full potential of current state-of-the-art X-ray detectors used in synchrotron applications, medical imaging, X-ray scanning equipment for border control, detectors for homeland security, and small animal research, which is essential to the development of new drugs in a rapid, cost-effective manner.

Company:

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

Project Title:

High Efficiency High Resolution Sensor for Hard X-Ray Micro tomography

Project Summary:

Development of this scintillator material will enable exploitation of the full potential of current state-of-the-art X-ray detectors in synchrotron applications, as well as medical imaging, homeland security (e.g. X-ray scanning equipment at airports and border crossings), and small animal research (essential to the rapid and cost-effective development of new medications).

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TOPIC: Wind Energy Technology Development

Company:

Conispire, LLC
337 Summer St.
Boston, MA 02210-1707

Project Title:

Development of On-Site Conical Spiral Welders for Large Turbine Towers

Project Summary:

This project's innovative technology allows large wind turbine towers to be produced on-site, eliminating the transportation constraints that currently hold back the wind industry. This enables larger and taller towers which reach stronger winds, significantly reducing the cost of wind energy. By producing towers that are larger and more valuable than what can be shipped, we give domestic manufacturing a significant cost advantage over towers produced in low wage countries.