# SBIR/STTR Fiscal Year 2012 Release 1 Phase I Awards Sorted by Topic

**TOPICS:**

**TOPIC: Advanced Network Technologies and Services**

**Company**
Accelerated Data Works, Inc.
2831-A NW 41st Street
Gainesville, FL 32606-6690

**Title:**
Holistic Operations Planning System (HOPS)

**Summary:**
Large-scale computer network planning is a difficult task with limited management-tool support. This software integrates with existing network management systems to provide operators the tools and high level reports needed to reduce costs, make better decisions, and communicate the status of their network with stakeholders.

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**Company**
Aurrion, Inc.
130 Robin Hill Road STE 300
Goleta, CA 93117-3153

**Title:**
Integrated 100Gb/s Transmitter Chips

**Summary:**
This project will improve the performance of individual semiconductor chip-based components and also allow the integration of all of these components into a single chip enabling the power and size of a typical XFP module today. Wafer scale integration and foundry fabrication also will ultimately enable a significantly lower cost for these modules.

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**Company**
Fusion Factors LLC
1400 Technology Dr.
Harrisonburg, VA 22802-2542

**Title:**
Low-Cost Fiber Optic Network Reflectometer

**Summary:**
This program develops new telecommunications testing equipment to enable monitoring and maintenance of sophisticated optical networks at 10x lower cost and enhanced performance than current equipment. This development effort will address the emerging need for massive

deployment of optical network infrastructure with new, much cheaper instruments to test optical signal quality and network faults.

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**Company**
Referentia Systems Incorporated
155 Kapalulu Place, Suite 200
Honolulu, HI 96819-000

**Title:**
LiveMap: A Multi-domain Network Flow Visualization and Analysis Tool

**Summary:**
Referentia Systems will develop an intelligent network management solution for troubleshooting network performance. The tool, called LiveMap, will create situational awareness of the network in real time to enable IT operators to peer into any portion of the network from end-to-end and mitigate issues over multiple domains.

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**STTR Project**
**Company**
The Samraksh Company
5980 Venture Drive
Suite 1B
Dublin, OH 43017-2237

**Title:**
Programmable, Extensible and Secure perfSONAR Appliance for Multi-domain Enterprise Monitoring

**Summary:**
Multi-domain enterprise network monitoring solution that aids Network Operators in improving the programmability, extensibility and security of perfSONAR.

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**Company**
Ultra Communications, Inc.
990 Park Center Drive, Suite H
Vista, CA 92081-8352

**Title:**
Embedded Photonic Components for 100 Gbps Data Transport

**Summary:**
This program will develop technology for integrating optical interconnections within high performance ASIC packaging. This innovation to fiber optic component technology increases the performance, reduces the size and reduces the power consumption of optical communications within dense network systems, such as advanced distributed computing systems and data centers.

This technology will address the evolution of data transmission requirements, as the trend continues to implement optical components in close proximity to the data source/sink.

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**TOPIC: Increasing Adoption of HPC Modeling and Simulation in the Advanced Manufacturing and Engineering Industries**

**Company**
Advanced Rotorcraft Technology, Inc.
635 Vaqueros Avenue
Sunnyvale, CA 94085-3524

**Title:**
High Fidelity Wind Turbine Analysis Tool Leveraging High Performance Computing (HPC)

**Summary:**
Under this SBIR, Advanced Rotorcraft Technology, Inc. will develop the Wind Turbine Comprehensive Analysis System (WTCAS). WTCAS will provide turnkey wind turbine analysis functionality to allow the wind industry to better analyze and implement novel wind turbine designs that improve performance and reliability, reduce acoustic noise, and lower maintenance costs.

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**Company**
Altasim Technologies, LLC
130 East Wilson Bridge Road
Suite 140
Worthington, OH 43085-2327

**Title:**
CMC Manufacturing Technology

**Summary:**
New design tools for advanced materials developed for the US Air Force are too complex and computational intensive for use by small to medium sized businesses. The proposed work will extend access and availability of these design tools to businesses that serve the automotive, chemical processing and energy production sectors.

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**STTR Project**
**Company**
Argo Navis Technologies, LLC
999 Windcroft Pl
Annapolis, MD 21401-6578

**Title:**
A Scalable Targeted Debugger for Scientific and Commercial Computing

**Summary:**
Programmer productivity is a key to economic development in IT environments. The larger the computer system or data center, the harder it is to find bugs in the software and the more costly is the delay in not finding the bugs. The Swat project will produce a cost effective and efficient software tool that can help even the least experienced programmer develop correctly running programs in such environments.

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**Company**
Argo Navis Technologies, LLC
999 Windcroft Pl
Annapolis, MD 21401-6578

**Title:**
SpeedShop Ease of use Performance Analysis for Heterogeneous Processor Systems

**Summary:**
Supercomputing applications can better utilize hardware resources when performance bottlenecks within software are identified and eradicated; tools that allow a developer to find these problem areas typically require an expert to perform the analysis. This project seeks to allow a non-expert user to employ such tools by providing unified intuitive performance analysis on systems where all the processors are not of the same type.

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**Company**
Buildlab, LLC
56 Mill Street
Dryden, NY 13053-9715

**Title:**
Tools for Auto-Calibration of Building Energy Models and Predictive Control

**Summary:**
The goal of this proposal is to advance energy modeling software and full building sensor networks, optimizing energy-efficiency and performance in the design and operation of buildings.

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**Company**
Enthought, Inc.
515 Congress Ave. Suite 2100
Austin, TX 78701-3555

**Title:**
A Python Interface to Trilinos/Tpetra for High-Level Access to HPC Solvers

**Summary:**

Software originally developed for the NNSA will be made much more user friendly to enable scientists and engineers throughout industry and academia to easily benefit from its robust performance in HPC computing.

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**Company**
Harmonia Holdings Group, LLC
2020 Kraft Dr, Suite 1000
Blacksburg, VA 24060-6492

**Title:**
HPC Auto-Assistant: Making HPC Software and Tools Easier to Use for the Experienced (Not Expert) User

**Summary:**
Widespread use of HPC makes the U.S. more competitive and improves profits; when lower tier companies use HPC they improve their own profitability, and that of companies they support as sub-contractors. HAA allows smaller companies to use HPC, assisting in economic recovery and in turn the creation of jobs.

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**Company**
Jmsi Inc. Dba Intelligent Light
301 Route 17N
7th Floor
Rutherford, NJ 07070-2575

**Title:**
FieldView-VisIT : A Modern Engineering Post-Processing System for Ultra-Scale Physics Based Simulations

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

**Title:**
Graphical HPC Application Suite for Supporting the Product Simulation Lifecycles

**Summary:**
This project will enable wider adoption of advanced HPC functionality by small and medium size manufacturing firms by providing a suite of applications that can address the complete simulation lifecycle. The suite will be built using existing Open Source HPC Toolkits and will be dynamically customizable in order to address the specific needs of targeted vertical markets.

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**Company**
Light Foundry, LLC
2920 Bluff Street #214

Boulder, CO 80301-1269

**Title:**
User-Centered, Collaborative, Web and Radiance-Based Lighting Simulation, Visualization, and Analysis

**Summary:**
This proposed research effort will create innovative, collaborative lighting analysis and visualization tools based on the Radiance simulation software, which will help a variety of people formulate, manage, and solve complex environmental problems. These tools will help people design green-buildings that are both beneficial to the environment and its occupants.

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**Company**
Newton Energy Group LLC
47 Huntington Rd
Newton, MA 02458-2416

**Title:**
pCloud: A Cloud-Based Power Market Simulation Environment

**Summary:**
The project will use cloud computing to develop a new generation of simulators to model the operation of electrical grids. These simulators will be fast and relatively inexpensive to use by industry stakeholders. The technology will improve design and analysis of the U.S. electrical grid and will contribute to improved efficiency of markets for electric energy.

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**Company**
Nimbis Services Inc.
1616 Anderson Road
McLean, VA 22102-1602

**Title:**
Manufacturing Expertise as a Service Portal

**Summary:**
Technical expertise solution that matches computing, software, and expertise resources from labs, specialists and universities to assist industry.

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**Company**
Nutonian Inc.
641 Highland Rd.
Ithaca, NY 14850-1411

**Title:**
The Data Genome Project

**Summary:**
This project will develop a new HPC Turnkey system that can automatically find mathematical invariants in large datasets, and then use those invariants to identify new relationships between datasets of different users.

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**Company**
Optimal Solutions, Inc.
17 Kershaw Ct
Bridgewater, NJ 08807-2595

**Title:**
Optimization-Based Production Scheduling for Complex Manufacturing Plants Delivered as a Service using High Performance Computing Architecture & Algorithms

**Summary:**
This project will address the problem of dimensionality in today's optimization based approaches to scheduling jobs in manufacturing, which often results in inferior solutions that cannot be scaled to real manufacturing environments. It is expected to result in increased efficiency and global competitiveness in this sector and lead to the creation of new manufacturing jobs.

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**STTR Project**
**Company**
Rnet Technologies, Inc.
240 West Elmwood Drive
Suite 2010
Dayton, OH 45459-4248

**Title:**
Catalytic Converter Modeling on Emerging Personal Computers and Small Clusters

**Summary:**
Computer Simulation of catalytic converters is very expensive in terms of high performance computing resources and also takes several days to get the final results. Software design and engineering targeting state-of-the-art computer architectures enables simulation on desktop workstations and generates the results in overnight turnaround time.

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

**Title:**
Packaging PETSc for Commercialization

**Summary:**

Computer-aided engineering is crucial to U.S. manufacturer's ability to maintain an innovative edge over competitors. We will enable a DOE-funded software library to be more easily used by U.S. manufactures and software vendors in order to strengthen their ability to innovate.

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**Company**
Vorcat, Inc.
14 Freas Court
North Potomac, MD 20878-2586

**Title:**
Extension of the Vorcat Technology to Moving Boundaries

**Summary:**
This project will develop reliable and efficient strategies for simulating the complex turbulent flows produced by moving boundaries associated with a wide range of next generation energy-related technologies such as wind turbines, ground vehicles, and wave and ocean current power generators.

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**Company**
Z-terra Inc.
16225 Park Ten Place
Suite 370
Houston, TX 77084-5089

**Title:**
Enterprise Software for Interactive and Super Efficient Processing of Large Multi-Dimensional Datasets

**Summary:**
This research project combines current research from U.T. Austin with oil and gas state-of-the-art 3-D seismic imaging technology from Z-Terra Inc., to develop super-efficient enterprise software for accurately creating 3-D subsurface images of geologically complex areas. Such imaging technology allows oil-and-gas companies to create 3-D images of the earth and reduce development costs, increase the amount of hydrocarbons recovered and increase the amount of national oil reserves.

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**Company**
Ziena Optimization LLC
1801 Maple Avenue
Evanston, IL 60201-3149

**Title:**
High-Performance Nonlinear Optimization Software for Power Applications

**Summary:**

The results of this project will enable electric utilities and power grid operators to optimize their power distribution efforts over a much larger scale than at present, with the aim of making a substantial contribution to the energy efficiency of the U.S. economy.

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**TOPIC: Atmospheric Measurement Technology**

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

**Title:**
LED-Based Photoacoustic Particle Optical Absorption Monitor

**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.

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**Company**
Brechtel Manufacturing Incorporated
1789 Addison Way
Hayward, CA 94544-6900

**Title:**
Development of a Compact Instrumentation Package for Characterization of Aerosols, Turbulence and Surface Characteristics in the Arctic from Unmanned Aerial Vehicles

**Summary:**
Brechtel Manufacturing Incorporated (BMI) proposes to develop a new air quality and climate change-relevant instrument suite to measure the size distribution of airborne nanoparticles. The device will be simple to use, inexpensive, easily deployable for remote operation, and offer sensitivity to a broad range of particles found in the air we breathe.

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**Company**
Droplet Measurement Technologies
2545 Central Avenue
Boulder, CO 80301-2865

**Title:**
A Compact, Low Power Depolarization Backscattering Cloud Spectrometer for Water and Ice Discrimination

**Summary:**
An ultra-light, low power instrument is being developed to make airborne measurements of the properties of aerosol and cloud particles, in particular water droplets and ice crystals in Arctic Clouds. This instrument is highly sensitive to particle shape and has immediate applications on commercial aircraft for detecting volcanic ash, dust and ice crystals, all particles that impact engine performance.

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**Company**
Msp Corporation
5910 Rice Creek Parkway
Suite 300
Shoreview, MN 55126-5025

**Title:**
Real-Time Size-Distributed Measurement of Aerosol Mass Concentration

**Summary:**
This technology will enable the rapid measurement of particles in any atmospheric, outdoor, or work-place environment. The ease and speed of these instruments will substantially increase the soundness of decisions related to protecting human health, protecting US military deployments, and mitigating the effect of energy development on the environment.

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**STTR Project**
**Company**
Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810-1077

**Title:**
Networkable Automated Water Vapor Lidar for Tropospheric Profiling

**Summary:**
This project will produce a new sensor that, when assembled into networks, could help to increase the predictive capability of both weather forecasts and climate change models.

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**STTR Project**
**Company**
Seaforth, LLC
Campus Delivery - 1320
Engineering Research Center - CSU
Fort Collins, CO 80523-1320

**Title:**
Versatile Instrument for Broadband Measurements of Aerosol Extinction and Absorption

**Summary:**

Optical properties of aerosols play a key role in air quality, visibility, and potential effects of climate change. The proposed instrument provides new and improved capability in terms of measuring aerosol optical properties to address these challenges.

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**TOPIC: Carbon Cycle Measurements of the Atmospthere and the Biosphere**

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

**Title:**
Compact High Precision Field Instrument for all Major Greenhouse Gases

**Summary:**
We will design a highly sensitive trace gas monitor that is unique in simultaneously and rapidly measuring the atmospheric concentrations of the three most important greenhouse gases: carbon dioxide, methane and nitrous oxide. This instrument will quantify the sources and sinks of the gases which primarily drive global climate change.

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**Company**
Applied Spectra, Inc.
46661 Fremont Blvd
Fremont, CA 94538-6410

**Title:**
New Technology of Rapid Isotopic Measurement of Soil Organic Manner to Quantify Carbon Sequestration in Climate Change Studies

**Summary:**
This project will demonstrate and evaluate a new technology called LAMIS (Laser Ablation Molecular Isotopic Spectroscopy) which was developed to address the measurement of carbon and nitrogen isotopes. LAMIS provides isotope ratio measurements in real-time, at atmospheric pressure (no mass spectrometer) and without sample preparation.

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**Company**
Kwj Engineering Incorporated
8440 Central Avenue
Suite 2D
Newark, CA 94560-3453

**Title:**
High Performance Low Power Electrochemical CO2 Gas Sensor

**Summary:**

This SBIR program will develop a novel sensor that will support the acquisition of high quality data to support carbon cycle management throughout the United States. This sensor will provide reliable data on CO2 ambient changes in a wide variety of locations.

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

**Title:**
Portable System for the Measurements of Concentration, Isotopic Composition and Flux of Ambient CH4 and CO2 Released from Soil and Water

**Summary:**
Los Gatos Research proposes to develop a field-deployable analyzer to monitor greenhouse gases (e.g. methane and carbon dioxide) emitted from the soil. Such measurements are critical to better understanding the Earth's carbon balance and developing unconventional energy sources (e.g. shale gas deposits).

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

**Title:**
Carbon Sensor Network System

**Summary:**
Measurement technology is needed to quantify annual net changes of carbon in terrestrial vegetation, and in emissions from various sources, over large areas. A network of all-weather, miniaturized, high-accuracy optical sensors will be developed for simultaneous monitoring of carbon dioxide, carbon monoxide, and methane concentrations distributed over large areas.

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**TOPIC: Genomic Science and Related Biotechnologies**

**Company**
Gigagen Inc.
409 Illinois St
San Francisco, CA 94158-2509

**Title:**
Massively Parallel Single Cell Transcriptomics

**Summary:**

Biofuel and ecology researchers want to understand this variation microorganisms single cell level, but conventional technology for single cell analysis is slow and expensive. We propose a new technology that will make single cell analysis much faster and cheaper, which has important applications in biofuels, ecology, and biomedicine.

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

**Title:**
Cloud Computing and Visualization Tools for KBase

**Summary:**
Genetics and biology researchers are being inundated with data that must be processed with complex computer algorithms. We intend to produce a new open source architecture for systems biology researchers to produce, share, and run their algorithms using scalable cloud computing platforms.

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**Company**
Kultevat, LLC
2692 E Street
San Diego, CA 92102-2717

**Title:**
Rapid Impedance Methods for Assaying Hydrocarbons and Fermentable Sugars in Plant Materials

**Summary:**
The goal of this project is to develop tools and methods which shorten the time, and reduce the cost, of breeding new, improve bioenergy crops, and enhancing their yield traits.

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**Company**
Zachary Apte Dba Evolvemol
1442A #444 Walnut St.
Berkeley, CA 94709-1405

**Title:**
A Microfluidic Platform for the Discovery and Functional Annotation of Metagenomic Enzymes

**Summary:**
This project will develop a high-throughput, microfluidic platform technology to identify genes and metabolic networks involved in producing enzymes with specific activity. This technology will take a enzyme substrate and rapidly find metagenomic sequences involved in its conversion. The method allows quick sampling of the enormous functional reservoir of novel genes from a metagenome for applications in bioenergy, biosequestration, bioremediation and beyond.

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

**STTR Project**
**Company**
Climate Forecast Applications
845 Spring ST. NW #129
Atlanta, GA 30308-1043

**Title:**
Application of Global Weather and Climate Model Output to the Design and Operatio of Wind-Energy Systems

**Summary:**
CFAN's proposed wind-energy forecasting decision support tool will resolve limitations of existing forecast solutions to provide improved ability to incorporate wind based power supply into the national energy mix and assist in the proper expansion of capacity in both inland and offshore locales.

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**Company**
Ientech LLC
1780 Corsica Drive
Wellington, FL 33414--104

**Title:**
A Watershed Based Web Tool Enhancing Climate Model Output Usage

**Summary:**
This watershed based web tool system investigates climate change impacts by animated visualization and readily usable information required for watershed hydrological assessment, drought/flood management, agriculture management, pollution control management and land use planning.

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**TOPIC: Technologies for Subsurface Characterization and Monitoring**

**Company**
Brooks Rand Labs
3958 6th Ave NW
Seattle, WA 98107-5058

**Title:**
An Automated, Atomic Fluorescence-Based, Field Deployable Groundwater Mercury Monitoring System

**Summary:**
Brooks Rand Labs proposes to design an automated, field deployable system to measure mercury concentrations in water. This will greatly reduce the cost of measuring mercury in the environment and could lead to a large increase in the availability of data, especially real-time data.

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**Company**
Freestone Environmental Services, Inc.
1100 Jadwin Avenue, Suite 250
Richland, WA 99352-3425

**Title:**
Real-Time, In Situ Measurement of Hexavalent Chromium in Groundwater

**Summary:**
The U.S. Department of Energy is seeking a remote sensor for measuring chromium contamination in groundwater wells. Laboratory methods based on spectrochemical analysis are being adapted for remote, submerged, long-term measurement.

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**Company**
Giner, Inc.
89 Rumford Avenue
Newton, MA 02466-1311

**Title:**
Field Monitor to Measure Chromium and Cobalt in Subsurface Water and Soil

**Summary:**
Giner, Inc. proposes to develop a field-deployable electrochemical sensor with near-real-time response for monitoring chromium and cobalt pollution. The proposed sensor will improve monitoring capabilities by providing fast, reliable, and sensitive on-site quantification of these metals in groundwater, surface water, and soil.

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

**Title:**
Site-Specific Nitrous Oxide Isotope Analyzer for Measuring Bioremediation

**Summary:**
Los Gatos Research proposes to develop a field-deployable analyzer to monitor bioremediation of contaminated soil and groundwater by measuring the emitted nitrous oxide and its isotopes.

Such measurements are critical to monitoring and improving bioremediation at contaminated DOE sites.

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**Company**
Nanosonic, Inc.
158 Wheatland Drive
Pembroke, VA 24136-3645

**Title:**
Integrated Metal RubberTM Sensors for Subsurface Monitoring

**Summary:**
The proposed integrated Metal Rubber sensor network for subsurface monitoring is of help for the advanced management of remediation. The system can identify potential transfers on a real-time basis, allowing field sites to establish models concerning water transport, chemical migration, mass transfer and microbiologic activity.

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**Company**
Southwest Sciences, Inc.
1570 Pacheco Street, Suite E-11
Santa Fe, NM 87501-3993

**Title:**
Micro-Fluidic Spectrometer for Measuring Groundwater Contamination

**Summary:**
Southwest Sciences proposes to develop a micro-fluidic sensor for measuring heavy metals in groundwater by measuring their uv-visible spectra. High sensitivity will be obtained using cavity enhanced spectroscopy.

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

**Company**
Dynaflow, Inc.
10621-J Iron Bridge Road
Jessup, MD 20791-9381

**Title:**
Development of an Acoustic Instrument for Bubble Size Distribution Measurement in Mercury

**Summary:**
This project will develop an acoustic diagnostic tool that can meet all the bubble sizing requirements for Spallation Neutron Source (SNS) applications. It will build on the technology of the present state-of-the-art acoustic bubble sizing instrument, the ABS ACOUSTIC BUBBLE

SPECTROMETERÂ®Â©, which works well for void fractions of the order of 0.1% and for bubbles between 20 and 500 Î¼m in diameter.

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

**Title:**
Advanced Technologies for Compact 100 W-class Ultrafast Ti:sapphire Lasers to Support DOE Facilities Needs

**Summary:**
We propose to develop a high power ultrafast Ti:Sapphire amplifier system whose performance is well beyond the capabilities of current state of art technologies. This system will have very wide applicability in both science and industry, including for new science at the Advanced Photon Source at Argonne National Laboratory.

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**Company**
Materials Development, Inc.
3090 Daniels Court
Arlington Heights, IL 60004-0000

**Title:**
Manipulation of Samples at Extreme Temperatures for Fast in-situ Synchrotron Measurements

**Summary:**
Advanced materials research using x-rays is critical in making technological advances in areas such as pharmaceuticals, “smart materials” for energy storage, transportation and security technologies. This project will have a strong impact on US capabilities in advanced materials, energy technology and overall manufacturing competitiveness

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**Company**
Polaronyx, Inc.
2526 Qume Drive
Suites 17 & 18
San Jose, CA 95131-1870

**Title:**
Mid-Infrared High Energy Ultrafast Fiber Laser for X-Ray Science

**Summary:**
A high energy mid-infrared ultrafast fiber laser system will be developed for next generation long wavelength pumped X-ray sources. It will enable high energy (10 mJ), short pulse (100 fs), and compact high energy study.

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**Company**
Q-peak
135 South Road
Bedford, MA 01730-2307

**Title:**
High-Average Power, High-Energy, 2-um Laser Source for High-Harmonic Generation

**Summary:**
High pulse energy, high rate, picosecond, pulsed drive lasers to be developed in this program are essential for implementation of a new generation of table-top X-ray sources, with early applications in science and long-range uses in medical diagnostics, providing improved resolution over present X-ray systems.

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

**Title:**
Sub-Femtosecond Bunch Length Diagnostic

**Summary:**
This project will develop an ultrafast diagnostic with an unprecedented timing resolution of sub-femtoseconds, the natural time-scale of atomic motion. Such a device will find numerous applications in the areas of medicine, industry, security, and basic research.

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

**Title:**
Inverse Compton Source for Extreme Ultraviolet Lithography

**Summary:**
This project will develop an extremely bright source of extreme ultraviolet and X-ray radiation, which can be used for semiconductor manufacturing, medical imaging, and homeland security.

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

**Title:**
Manufacturing High Efficiency,yet High Resolution, Scintillator for Wide-Band X-Ray Analysis

**Summary:**
The development of the proposed scintillator will allow exploitation of the full potential of current state-of-the-art X-ray detectors used for synchrotron applications, medical imaging, scanning equipment for border patrol and homeland security, and small animal research (essential to the rapid and cost-effective development of new drugs).

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

**Title:**
Low Noise, High Rate X-Ray Spectrometer for Synchrotron Applications

**Summary:**
The proposed project aims to investigate a new detector design that will have far reaching implications in fundamental scientific studies as well as commercial applications. It will be useful in diverse fields such as materials studies, health care and space research.

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**Company**
Sydor Instruments, LLC
291 Millstead Way
Rochester, NY 14624-5101

**Title:**
Beam Position, Timing and Flux Monitors

**Summary:**
Sydor Instruments will collaborate with BNL to advance a Diamond-based beam monitor for synchrotron beamlines. These machine diagnostics will enable scientists to measure 3rd generation synchrotron “white beams” in terms of how many x-rays there are and where the beam is, to optimize the beam for the intended science goal.

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**Company**
Voxtel, Inc.
15985 NW Schendel Avenue
Suite 200
Beaverton, OR 97006-

**Title:**
Picosecond Rate X-Ray Photon Counting Detector

**Summary:**

A novel pixelated detector array will be developed that enables the realization of the improved time resolving capabilities of modern synchrotrons. This will enable the study of complex and dynamic processes that occur in biological systems.

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**STTR Project**
**Company**
Xradia, Inc.
4385 Hopyard Road
Pleasanton, CA 94588-2758

**Title:**
Development of Optimized Controls and Hardware for Synchrotron Hard X-Ray Microscopes with Advanced Spectroscopic Capabilities

**Summary:**
Xradia Inc. and Stanford Accelerator Laboratory are jointly developing a solution for elemental and oxidation state analysis in 3-D at nanometer length scale. Key applications for this technology are the development of new, reliable energy conversion and storage solutions based on nanotechnology.

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

**Company**
Muons, Inc.
552 N. Batavia Ave
Batavia, IL 60510-0000

**Title:**
High Power S-Band Vacuum Load

**Summary:**
A high-peak-power RF load will be developed for use in an ultra-high vacuum.

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

**Title:**
Development of a Superconducting RF Crabbing System based on a Quarter Wave Resonator for Ultrashort Pulses at Light Sources

**Summary:**

This SBIR project will build a novel “crabbing” cavity that rotates the electron beam in a storage ring x-ray source to produce short pulses of x-ray light - close to one trillionth of one second - for a variety of research purposes.

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

**Title:**
Continuous Wave Thermionic Copper RF Gun for Compact FELs

**Summary:**
Compact Free Electron Lasers are a new class of tunable high power lasers that offer an economical option for isotope production, novel x-ray sources and other applications. Niowave proposes to develop the high power electron source required to operate the compact Free Electron Laser.

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**TOPIC: Advanced Sources for Accelerator Facilities**

**Company**
Advanced Energy Systems, Inc.
27 Industrial Blvd
Unit E
Medford, NY 11763-2286

**Title:**
Development of a Field Emitter Array Based High-Current Electron Injector

**Summary:**
The National Academies has identified this as an area of critical importance to the development of high-power free-electron lasers. Should the program prove successful, not only would the cathodes provide improved economic and reliability performance for existing user facilities such as light sources and FELs, but could also allow penetration into markets presently restricted to thermionic cathodes such as environmental remediation systems for water remediation and flue gas scrubbing.

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

**Title:**
Asymmetric Immersed Pole Undulators for Advanced Radiation Sources

**Summary:**
Calabazas Creek Research, Inc. (CCR) is proposing to develop a high-field, short-period magnetic undulator, the Asymmetric Immersed Pole (AIP) undulator, for applications in high-energy accelerator light sources. The AIP undulator will extend the performance of light sources and their applications to nano-materials, applied physics, chemistry, biology, and the commercial, medical, and military technologies they support.

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

**Title:**
Improvement on Short Period Planer Undulator

**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**
Iap Research, Inc.
2763 Culver Avenue
Dayton, OH 45429-3723

**Title:**
Magnets for Cryogenically-Cooled Permanent Magnet Undulators (CPMU)

**Summary:**
The project will deliver high performance PrFeB permanent magnets that will be suitable for use in cryogenic permanent magnet undulators (CPMU). Such undulators will enable generation of brilliant beams of photons with energies of 50 keV that are currently unavailable in modern Synchrotron Light Sources.

---

**Company**
Muplus, Inc.
45 Jonquil Lane
Newport News, VA 23606-

**Title:**
High Brightness Superconducting RF Photo Injector Gun Cavity

**Summary:**
A novel design concept is being developed for a superconducting RF gun, which is a key component of next generation light sources that require high brightness electron beams.

---

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

**Title:**
Laser-Free RF-Gun as a Powerful THz Source

**Summary:**
This project will develop an intense, compact terahertz (T-ray) source. Applications include small container and personnel screening, cancer diagnosis and fundamental research.

---

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

**Title:**
Software for Modeling and Design of Diamond Amplifier Cathodes

**Summary:**
Novel high-current, high-brightness, low emittance electron sources are required for operation and major upgrades of existing and future DOE user facilities. High-fidelity software is being developed to enable new capabilities to design advanced, diamond amplifier cathodes.

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**TOPIC: Ancillary Technologies for Accelerator Facilities**

**Company**
Agiltron, Inc.
15 Presidential Way
Woburn, MA 01801-1040

**Title:**
Mode Locked Fiber Ring Laser Based High Power Oscillator System

**Summary:**
High pulse energy mode lock fiber laser with high repetition rate are a long sought goal of optical laser technology, useful for a broad range of research and commercial applications ranging from defense countermeasures to laser surgery. The proposed research will lead to the practical high pulse energy fiber laser to be used as the seeding laser for free electron laser.

---

**Company**
Alameda Applied Sciences Corporation
3077 Teagarden Street
San Leandro, CA 94577-5720

**Title:**
Nb Coatings for Bellows used in SRF Accelerators

**Summary:**
Alameda Applied Sciences Corporation proposes to use existing cathodic arc deposition hardware to provide a cost-effective upgrade for existing phosphor bronze accelerator bellows. AASC's commercial business will benefit from licensing this technology for upgrading many of today's cutting edge accelerators.

---

**Company**
Epic Consulting
101 Mountain Ridge Drive
Mount Sinai, NY 11766-1413

**Title:**
EPICS-Large-Scale High-Performance Integrated Data Storage for Accelerator and Beamline Experiments

**Summary:**
EPICS is an open-source control and data acquisition system that is a de-facto standard at DoE laboratory research facilities in the US. Through SBIR grant funding, a new generation of this software has been released to support physics applications and scientific data representation. This project prototypes the ability to archive these data at rates needed by our nation's energy and biological scientists to take advantage of the latest XRay lights sources and the state of the art detectors coming available for scientific research.

---

**Company**
Gener8 Incorporated
535 Del Rey Ave.
Sunnyvale, CA 94085-3514

**Title:**
Integrated 2.0 Micron Modelocked Laser for E-SASE Advanced Accelerator Applications

**Summary:**
We propose a novel new architecture for a mode-locked laser at 2.0 microns that is designed to achieve sub-100 fs pulse widths for application to free-electron laser (FEL)-based light sources that are using the enhanced self-amplified spontaneous emission (ESASE).

---

**Company**
Magiq Technologies, Inc.

11 Ward Street
Somerville, MA 02143-4214

**Title:**
Synchronization System for Next Generation Light Sources

**Summary:**
MagiQ Technologies is teamed with top scientists from Lawrence Berkeley Laboratory to develop a fiber optic-based synchronization and communication system for control of next-generation light sources.

---

**Company**
Q-peak
135 South Road
Bedford, MA 01730-2307

**Title:**
High Power Mid-IR Laser System for ESASE

**Summary:**
Revolutionary advances in the fundamental studies of atoms, molecules, and solids have been made possible by development of ultra-high-power, ultra-short pulse lasers, and associated optics. 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. Our program will make significant progress in the laser technology needed for the next generation of ultrafast X-ray systems, and will also reduce their cost and complexity.

---

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

**Title:**
Integrated Modeling of Beam Dynamics, Pulse Propagation and Lasing to Design Next-Generation Free Electron Lasers

**Summary:**
Free electron lasers are a key technology for scientific research, with emerging applications in the industrial processing of materials, and with future applications in shipboard self defense and homeland security. State-of-the-art software will be developed for this growing market.

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**TOPIC: Instrumentation for Advanced Chemical Imaging**

**STTR Project**
**Company**

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

**Title:**
High Spatial Resolution Coherent Ultrafast Spectroscopy

**Summary:**
This project will develop low-cost, high precision instrument to improve medical research, homeland security, and nanomaterials.

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**TOPIC: Instrumentation for Electron Microscopy and Scanning Proble Microscopy**

**STTR Project**
**Company**
Anasys Instruments Corp
121 Gray Avenue Suite 100
Santa Barbara, CA 93101-1809

**Title:**
Resonance-Enhanced Infrared Nanospectroscopy (REINS) based on Atomic Force Microscopy

**Summary:**
This STTR project will provide nanoscale measurement and mapping of the chemical composition of a wide range of materials and biological samples. This project will have extensive applications in materials and life sciences, including accelerated development of novel materials including those for energy generation, storage and conservation.

---

**Company**
Asylum Research Corporation
6310 Hollister Ave
Santa Barbara, CA 93117-3115

**Title:**
High Throughput Ionic and Electronic Transport Probing System

**Summary:**
Nanoscale probing and testing is essential to rapid evaluation and development of candidate energy storage materials. This project will develop a High Throughput Ionic and Electronic Transport Probing System to quickly evaluate these materials for their potential for increasing battery and fuel cell energy density and efficiency.

---

**Company**
Hummingbird Precision Machine Co, Dba Hummingbird
8300 28th Ct. NE

Units 200/300/400
Lacey, WA 98516-7126

**Title:**
Liquid and Full Pressure Range Gas Environmental TEM Specimen Holders for High-Resolution Elemental Analysis

**Summary:**
This project proposes to develop and commercialize electron microscope environmental gas and liquid specimen holders to give researches radically improved methods for studying energy storage and generation processes and materials at the nanometer scale. This should facilitate improvement of batteries and fuel cells and increase efficiency of catalytic processes.

---

**Company**
Hummingbird Precision Machine Co, Dba Hummingbird
8300 28th Ct. NE
Units 200/300/400
Lacey, WA 98516-7126

**Title:**
Cross-Correlative Double-Tilt Nano-Mechanical Testing Platform for The Transmission and Scanning Electron Microscopes

**Summary:**
Mechanical properties of nano-scale materials are important for ensuring the reliability of new generations of nano-scale electrical and mechanical devices. This proposal focuses on the development of a tool to enable electron microscopy studies of the mechanical properties of materials and their correlation with the atomic structure of the materials.

---

**Company**
Nion Company
1102 8th Street
Kirkland, WA 98033-5666

**Title:**
Ultra High Energy Resolution Electron Spectrometer for Atomic Resolution Studies

**Summary:**
A research instrument that will open a fundamentally new window on the properties of materials at the atomic scale will be designed and built. The instrument will provide a better understanding of the role of key atomic constituents in devices such as efficient batteries and fuel cells. This will help with the design of energy conversion and storage devices of increased efficiency, and bring us closer to a green economy entirely based on renewable resources.

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**TOPIC: Instrumentation and Tools for Materials Research Using Neutron Scattering**

**Company**
Adelphi Technology, Inc.
2003 East Bayshore Rd.
Redwood City, CA 94063-4121

**Title:**
Compound Magnetic Lens for Providing Focused, Polarized Neutrons

**Summary:**
The enhancement of neutron beam lines with the use of magnetic lenses as neutron focusing and imaging optics could benefit U.S. industrial, government, and academic R&D on these beam lines. Improving the R&D output of these beam lines is of important benefit to the U.S. economy and technology.

---

**Company**
Ordela, Inc.
1009 Alvin Weinberg Drive
Oak Ridge, TN 37830-8012

**Title:**
Characterization and Application of a Novel Neutron Detection Method to Replace Helium-3 in Advanced Neutron Detectors.

**Summary:**
Available detector technology limits full utilization of intense neutron beams for advanced materials research at facilities such as the Spallation Neutron Source (SNS) at ORNL. Boron-10 lined pixel-cell detectors would remove limitations on neutron-scattering experiments and could be useful for applications in locating fissile materials for national security applications.

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**TOPIC: Instrumentation For Ultra-bright or Ultra-fast X-Ray Sources to Enable Materials Research**

**Company**
Delaware Diamond Knives, Inc.
3825 Lancaster Pike
Wilmington, DE 19805-1558

**Title:**
Diamond Refractive Focusing Optics

**Summary:**
Diamond provides the thermal qualities needed to improve the performance of beam lines in advanced photon light sources. This project will develop the manufacturing techniques for producing diamond optics for applications that see the highest heat load while improving the quality of the transmitted beam.

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**TOPIC: Catalysis**

**Company**
Evernu Technology LLC
306 Camars Drive
Warminster, PA 18974-3874

**Title:**
Production of Methacrylic Acid and Other Oxygenated Chemicals Solely from Renewable Non-food Biomass Derived Feedstocks

**Summary:**
The most predominant conventional process is the ACH process, which not only requires large volumes of fossil fuel-based feedstocks, but also consumes large amount of energy and produces large quantity of toxic wastes. Thus, there are strong needs and significant benefits to develop a novel process to enable the production of MAA and other oxygenated chemicals solely from renewable non-food biomass derived feedstocks. In additional to the potential of replacing billion pounds per year of fossil fuel-based feedstocks with ones solely derived from non-food biomasses, the proposed innovation by EverNu also offers two other potentially very significant public benefits by completely eliminating the serious environmental problems and greatly reducing the intensive energy consumption, both of which are inherent of the ACH process.

---

**Company**
Gate Fuels Inc.
3107 Alice Dr
Blacksburg, VA 24060-1600

**Title:**
High-yield Production of Fumarate from Cellulosic Biomass by Recombinant Cellulolytic Bacillus subtilis

**Summary:**
This project will provide a low-cost route for high-yield fumarate production from pretreated non-food cellulosic biomass mediated by recombinant cellulolytic Bacillus subtilis. The cellulose fraction of biomass feedstock contains more than one half oxygen by weight, making it a good starting material for the production of oxygen-containing polymeric monomers. The goal of this project is to develop an industrially-safe recombinant cellulolytic Bacillus subtilis strain that can produce high-yield fumarate from cellulosic materials in a two- step fermentation.

---

**Company**
Giner, Inc.
89 Rumford Avenue
Newton, MA 02466-1311

**Title:**
Carbon Nitride Supported Iridium Oxide (IrO2) Catalyst for Proton Exchange Membrane Electrolysis

**Summary:**
The proposed innovation aims to develop an advanced catalyst for proton exchange membrane water electrolysis that is inherently active and economically feasible. This effort will make water electrolysis more efficient and competitive compared to other hydrogen production technologies.

---

**Company**
Proton Energy Systems
10 Technology Drive
Wallingford, CT 06492-1955

**Title:**
Economical Production of Hydrogen Through Development of Novel, High Efficiency Electrocatalysts for Alkaline Membrane Electrolysis

**Summary:**
Proton OnSite manufactures hydrogen generation systems which can be integrated with renewable energy sources to generate hydrogen fuel while producing minimal carbon footprint. This project aims to reduce the cost of this technology through development of improved electrode materials designed to reduce raw material cost and improve electrical efficiency.

---

**Company**
Suganit Systems Inc.
10903 Hunt Club Rd.
Reston, VA 20190-3912

**Title:**
Direct Catalytic Conversion of Lignin to Aromatic Compounds

**Summary:**
A renewable, cost-effective method is proposed for production of aromatic chemicals (monomeric phenols) using lignin, currently a waste stream in biorefineries. This novel method employs homogeneous catalysis of lignin in ionic liquids (low melting temperature salts) with inexpensive catalysts at mild operating conditions.

---

**STTR Project**
**Company**
Trillium Fiberfuels, Inc.
720 NE Granger Ave. Bldg B
Corvallis, OR 97330-9660

**Title:**
Advanced Recombinant Manganese Peroxidase for Synthesis of Lignin Bioproducts.

**Summary:**
Biomass is composed of up to 30% lignin, which is not fermentable. To enable lignin usage to make high-value chemicals, this research will develop a scalable method for producing the lignolytic enzyme manganese peroxidase (MnP). Products from MnP action on lignin will be investigated for potential use in a biorefinery.

---

**Company**
Ultracell LLC
399 Lindbergh Avenue
Livermore, CA 94551-9291

**Title:**
Integrated Reformer with an Electrochemical Separator using a High Temperature Solid Acid Membrane

**Summary:**
A new reactor will be designed and fabricated to perform hydrogen generation, purification, and compression simultaneously. The new reactor can be used as a standalone hydrogen generator or integrated into a fuel cell system.

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**TOPIC: Membranes for Industrial Applications**

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

**Title:**
Permselective Membrane for Separation of Aromatic-Aliphatic Mixtures

**Summary:**
Current methods for separating aromatic and aliphatic hydrocarbons in petrochemical plants are energy intensive and complex. Aspen Products Group, Inc. will develop a highly permeable and selective membrane that will achieve this separation in a more cost-effective manner.

---

**Company**
Clean Membranes, Inc.
100 Waltham Street
Lexington, MA 02421-5413

**Title:**
Fouling Resistant Membranes for Efficient Oil Well Wastewater Treatment

**Summary:**

This project will develop efficient, high flux, fouling resistant filtration membranes formed with self-organizing polymers for treating oil well produced water. This will provide energy and cost savings to the industry, decrease materials use, and increase effluent quality, thereby reducing the discharge of contaminated water and enabling wastewater reuse

---

**Company**
Compact Membrane Systems, Inc.
335 Water Street
Newport, DE 19804-2410

**Title:**
Novel Membrane Systems for Olefin/Paraffin Separation

**Summary:**
This project will result in a process that will reduce the cost of manufacturing two widely used polymers, polyethylene, and polypropylene, by increasing the feedstock usage efficiency of the polymerization process.

---

**STTR Project**
**Company**
Eagle Engineering & Testing Services
4110 York St.
Bellingham, WA 98229-5010

**Title:**
Development of a Fatty Acid Esterification Catalytic Membrane Reactor

**Summary:**
This project will develop a solid catalytic membrane reactor to eliminate the acid neutralization requirement and the methanol vaporization / distillation steps before proceeding to the transesterification step.The use of Biodiesel in the U.S. is presently hampered by a lack of suitable feedstocks that do not compete with the food industry.

---

**Company**
Mound Laser & Photonics Center, Inc.
965 Capstone Drive, Suite 308
P.O. Box 223
Miamisburg, OH 45343-0223

**Title:**
Micro-Hole Membrane for Solid-Liquid Separation of Micron-Scale Particulate

**Summary:**
Polymer membranes with laser drilled micro-holes will enable wider and more efficient use of low pressure solid-liquid separation techniques that vastly reduce domestic energy usage in

consumer product industries, while also facilitating key techniques for alternative energy production.

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**TOPIC: Advanced Clean Energy Research**

**Company**
Green Pacific Biologicals, Inc.
409 Illinois St
San Francisco, CA 94158-2509

**Title:**
A Novel Oil Secretion Mechanism for Cost-Effective Algal Biofuel Production

**Summary:**
This project will develop novel bioengineering solutions that, if successful, will reduce production costs of renewable algae biofuels to around $50/barrel.

---

**STTR Project**
**Company**
Hifunda, LLC
2150 South 1300 East
Suite 500
Salt Lake City, UT 84106-4375

**Title:**
Ultra-High Temperature Thermal Barrier Coatings

**Summary:**
The new coating technology developed through this STTR program can help to increase energy efficiency of gas turbines, reduce energy costs, maintain US leadership in the gas turbine equipment, and reduce greenhouse emissions

---

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

**Title:**
Nanowires for CO2 reforming into fuels by sunlight

**Summary:**
In this phase I SBIR project, we propose to develop a new type of photo-catalyst nanowire structure for high yield CO2 reforming into fuels and useful chemicals by sunlight energy.

---

**Company**
Powdermet, Inc.
24112 Rockwell Drive
Euclid, OH 44117-1252

**Title:**
Multilayered Yttria-Stabilized Zirconia Coating for Improved Thermal Abrasion Resistance

**Summary:**
This project improves turbine efficiency through the application of a strong, temperature-resistant ceramic film to the turbine blades. The increased turbine efficiency results in reduced energy usage, environmental impact, and costs.

---

**Company**
Sem-com Company, Inc.
1040 N. Westwood Ave.
Toledo, OH 43607-3263

**Title:**
Stable Glass-Ceramic Nanocomposites as Compliant Seals for SOFCs

**Summary:**
Over the years many applications have been abandoned because the mismatch between the sealing components was too great to be of practical consequence or because no high CTE glasses were available. A compliant seal technology will open up at least some of these applications to hermetic seal technology. The high CTE hexacelsian glass, especially with the addition of the nano-scale materials will allow a new family of high CTE sealing glasses to be developed that do not exist today. These high CTE glasses would be especially useful in glass-to-metal applications.

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**TOPIC: High Performance Materials for Nuclear Application**

**Company**
Aeroprobe Corporation
2200 Kraft Drive, Suite 1475
Blacksburg, VA 24060-6164

**Title:**
Near Net Shape Consolidation of Oxide Dispersion Strengthened Alloy Powders

**Summary:**
Fabrication of ODS alloy structures is problematic due to 1) the inability to utilize any liquid-phase process such as casting, welding, laser cladding, etc. 2) grain coarsening caused by traditional heat treatment processes, 3) lack of geometric flexibility with current solid-state fabrication methods such as extrusion, 4) the need for coating and joining of dissimilar metals in

the solid phase. Traditional thermal processing increases grain size dramatically which both reduces creep strength as well as decreases radiation resistance. Aeroprobe proposes a solid-phase, near net shape consolidation process, friction stir-fabrication (FSF), for ODS alloys and structures that will overcome these current challenges.

---

**Company**
Matech / Gsm
31304 Via Colinas, Suite 102
Westlake Village, CA 91362-6731

**Title:**
High Temperature SiC/SiC CMCs Tailored for Nuclear Environments

**Summary:**
MATECH seeks to demonstrate high purity stoichiometric SiC/SiC composites using USA's first low cost, domestic SiC ceramic fibers for use in advanced nuclear reactors. This technology could not only improve America's energy self-reliance, but generate significant high wage domestic manufacturing jobs.

---

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

**Title:**
Crack-free, Oxidation-Immune Coatings for Carbons

**Summary:**
This project will develop coatings that protect advanced materials used in nuclear reactor cores from degrading during both normal operation and accidents, increasing the safety of advanced reactor designs.

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**TOPIC: Low Cost, Optimized Redox Flow Battery Electrolytes, Novel Solid Ionic Conducting Membranes, and Rechargeable Air-Breathing Cathodes for Bat**

**Company**
Eic Laboratories, Inc. As Dharmasena Peramunage
111 Downey Street
Norwood, MA 02062

**Title:**
Nanocatalytic Rechargeable Lithium Air Cathodes

**Summary:**

The goal of this program is to develop a revolutionary battery with very high energy density suitable for electric cars and also load leveling of the electrical grid. The Li-Air battery is the only battery that has the potential of meeting the energy demand of a fully electric vehicle with a range comparable to the present gas-driven automobile.

---

**STTR Project**
**Company**
Faraday Technology, Inc.
315 Huls Drive
Clayton, OH 45315-8983

**Title:**
Flow Battery Structures to Improve Performance and Reduce Manufacturing Cost

**Summary:**
This program is developing a rapid, robust manufacturing process for redox flow battery components to lower manufacturing costs while improving performance. Lowering manufacturing costs of redox flow batteries could enable commercial applications in energy storage for utilities, grid service providers and equipment suppliers and create manufacturing jobs in the U.S.

---

**Company**
Tiax, LLC
35 Hartwell Avenue
Lexington, MA 02421-3102

**Title:**
Sodium Intercalation Battery for Stationary Storage

**Summary:**
This DOE award will enable TIAX to develop a rechargeable battery for stationary electrical energy storage applications that will facilitate and expand the penetration of renewable energy generating technologies such as wind and solar, thus increasing the energy and environmental security of the United States.

---

**Company**
Vinazene, Inc.
2853 Daleview Dr
Ann Arbor, MI 48105-9864

**Title:**
A Single Substance Organic Redox Flow Battery

**Summary:**

This project will advance the state of energy storage by improving the energy density of redox flow batteries. These new batteries will be useful in smoothing the fluctuations in energy supplied by solar or wind power.

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**TOPIC: Advanced Technologies and Materials for Fusion Energy Systems**

**STTR Project**
**Company**
Advanced Conductor Technologies LLC
3271 Big Horn St
Boulder, CO 803013246-

**Title:**
REBCO Coated Conductor Cables for Fusion Magnets

**Summary:**
The development of high-performance magnet cables made from high-temperature superconductors is necessary for the US to maintain their leadership position in superconductivity research, materials science, and fusion research.

---

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

**Title:**
High-Shear-Strength, Radiation-Resistant Electrical Insulations for Plasma Confinement Magnets

**Summary:**
High-performance magnets are a key component of the fusion energy programs under development by the U.S. Department of Energy. This work seeks to extend the state of the art in magnet technology to ensure the reliable operation of these future machines.

---

**Company**
Mesocoat, Inc.
24112 Rockwell Drive
Euclid, OH 44117-1211

**Title:**
Fused Coatings for Plasma Facing Components in Fusion Reactors

**Summary:**
The phase I SBIR program will develop a series of nano-/micro-composite coating materials to be applied to Plasma Facing Components using MesoCoat's high energy density fusion cladding

process, CermaCladTM. The high-temperature, corrosion resistant coatings and low cost manufacturing process will enable further development of fusion energy devices such as ITER.

---

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

**Title:**
Computational Materials Design of Tungsten Alloys with Improved Fracture Toughness and a Lowered Ductile to Brittle Transition Temperature (DBTT)

**Summary:**
Fusion energy is potentially a safe, environmentally-friendly energy source that relies on low-cost fuel readily available to the US. In order to realize the potential of fusion energy, a number of scientific and engineering hurdles must be overcome. To this end, QuesTek Innovations LLC proposes to develop a new class of tungsten alloys with improved material properties for use in high-temperature, high radiation environments present in fusion energy reactors.

---

**STTR Project**
**Company**
Supercon, Inc.
830 Boston Turnpike
Shrewsbury, MA 015545-338

**Title:**
Development of Joint Methods for 2G HTS Tape High-Current Cables

**Summary:**
This project attempts to demonstrate the feasability of a new superconducting cable in order to attain the required high magnetic fields.

---

**Company**
Tpl, Incorporated
3921 Academy Parkway North NE
Albuquerque, NM 87109-4416

**Title:**
Explosive Bonding of Plasma Facing Components

**Summary:**
TPL proposes to explosively clad high-temperature metal layers to steel or copper support structures that will make longer lasting plates for use in hot fusion energy reactors because they will better resist hot plasma erosion. This will enable lower cost electricity to be generated by this technology due to the efficiency of extremely hot plasmas and improving the ability to contain them.

**Company**
Ultramet
12173 Montague Street
Pacoima, CA 91331-2210

**Title:**
Robust Cellular Solid Breeder Material for Enhanced Tritium Production

**Summary:**
Nuclear fusion offers a technically viable means of generating energy consistent with current consumption levels and environmental preservation. Establishing the commercial viability of fusion requires the development of advanced materials and structures that allow reliable operation in the demanding reactor environment.

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**TOPIC: Fusion Science and Technology**

**STTR Project**
**Company**
Bridge 12 Technologies, Inc.
37 Loring Drive
Framingham, MA 01702-8768

**Title:**
A Novel High Efficiency 1.5 MW, 110 GHz Gyrotron with HE11 Output for Plasma Heating

**Summary:**
In this Phase I work, we propose to design a novel magnetic system, a new cavity and a novel internal mode transformer to mitigate the ACI effect to achieve ~60% efficiency. The novel internal mode launcher will result in direct HE11 output from the gyrotron in a corrugated waveguide thus avoiding the need for a large and expensive Matching Optics Unit (MOU) which is necessary for coupling the output power from current generation of gyrotrons (with TEM00-like output) to the HE11 mode in a corrugated waveguide transmission line. A successful achievement of the goals of this project in the proposed Phase I and a future Phase II will lead to the establishment of an alternative source in the United States for high power gyrotrons.

---

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

**Title:**
Fully Parallel MHD Stability Code

**Summary:**

FAR-TECH, Inc. plans to develop an effective numerical plasma stability analysis tool which will be used in examination of different plasma confinement approaches and in performance assessment of existing and proposed fusion experiments on the pass to develop commercially feasible nuclear fusion reactor.

---

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

**Title:**
Measurement of the Radial Electric Field in the Plasma Edge of the Lithium Tokamak Experiment

**Summary:**
A new diagnostic will be developed to support an experiment at the Princeton Plasma Physics Laboratory. This will enable the study of a new regime in plasmas and bring us closer to achieving fusion energy as a clean, safe, and abundant energy source.

---

**Company**
Princeton Scientific Instruments, Inc.
7 Deer Park Drive
Suite C
Monmouth Junction, NJ 08852-1921

**Title:**
U.S. ITER Diagnostics, X-ray Imaging Spectrometer

**Summary:**
The U.S participation in ITER, a full-scale experimental fusion energy device that will pave the way for clean energy, includes a high resolution core imaging x-ray spectrometer. The proposed effort will assess the ability of existing x-ray detector arrays to perform and survive in ITER's extraordinarily intense radiation environment and where they need improvement.

---

**Company**
Voxtel, Inc.
15985 NW Schendel Avenue
Suite 200
Beaverton, OR 97006-

**Title:**
Rad-Hard Dual-Threshold High Count Rate Silicon Pixel Array Detector

**Summary:**
A detector is being developed for x-ray pulse-probe and crystal spectroscopy measurements that include flexible x-ray photon counting modes of operation.

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**TOPIC: High Energy Density Plasmas and Inertial Fusion Energy**

**Company**
Janx Service
1530 Grand Ave
Piedmont, CA 94611-4330

**Title:**
Study of Implosion Physics of High-Energy z-Pinches

**Summary:**
The project is aiming to make breakthroughs in the driver technology for Inertial Confinement Fusion, which could be a major component of the next generation of the cheap and green energy.

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**TOPIC: Low Temperature Plasmas**

**Company**
Eden Park Illumination, Inc.
903 N. Country Fair Dr.
Champaign, IL 61821-3259

**Title:**
Low Temperature Microplasma UV Lighting Tiles for Water Purification and Sterilization

**Summary:**
Eden Park Illumination, Inc. will perform research for the development and commercialization of large arrays of microcavity plasmas capable of generating light in the wavelength range of UVB and UVC in a slim and flat form factor.

**STTR Project**
**Company**
Physical Sciences Inc.
20 New England Business Center
Andover, MA 01810-1077

**Title:**
RF Microplasma Arrays for Singlet Delta Oxygen Generation

**Summary:**
This project will develop a novel, low-power oxygen microplasma device for treatment of cancer and destruction of harmful biological organisms.

**Company**
Symbios Technologies, LLC
116 North College Avenue Suite 7
Fort Collins, CO 80524-4425

**Title:**
Elimination of Biological Matter in Power Plant Cooling Water using Low Temperature Plasma

**Summary:**
The cooling water used in power plants is an ideal breeding ground for bacteria and algae that decrease plant efficiency, drive up operating costs, and sometimes harm human health. We are developing a system that kills these organisms using an low temperature electrical plasma, without the need for added chemicals.

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**TOPIC: High Energy Physics Computational Technology**

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

**Title:**
In-Situ Analysis of Cosmological Simulations

**Summary:**
Cosmological simulations play a very important role in the DOE High Energy Physics Cosmic Frontier program. Critical challenges facing such simulations include workflow I/O and lack of domain-specific data analysis algorithms. To address this, we propose the development of a cosmology analysis framework for in-situ analysis and data-reduction of cosmological simulations paving a way forward toward the analysis of exascale datasets that are expected within the coming decade.

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**TOPIC: Advanced Concepts and Technology for High Intensity Accelerators**

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

**Title:**
1300 MHz PPM Focused Klystron for Project X

**Summary:**

Calabazas Creek Research, Inc. (CCR) is proposing to develop a 0.5 MW - 1 MW PPM-focused klystron. The advanced design of this device is expected to result in system costs that are significantly lower than those possible with conventional klystrons. The klystron will be useful for research and medical accelerators and other DoD and commercial applications.

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**Company**
Diversified Technologies, Inc.
35 Wiggins Ave
Bedford, MA 01730-2345

**Title:**
Integrated Resonant Cavity Combined Solid-State Transmitter

**Summary:**
The novel integrated resonant cavity solid-state amplifier will reduce the cost of RF and microwave power by allowing solid-state circuitry to replace the very large vacuum tubes which are progressively becoming obsolete.

---

**Company**
Omega-p, Inc.
258 Bradley Street
New Haven, CT 06510-1106

**Title:**
RF Cavity Chain and Magnetic Circuit for a 650 kW, 1.3-GHz Low-Voltage Multi-Beam Klystron for the Project -X Pulsed Linac

**Summary:**
The quest for understanding the origin of the universe requires continued search for elementary particles, for which high-energy accelerators are necessary tools. This project is to develop the cavity chain and magnetic circuit for a high-power microwave amplifier with simplified design and thus allow improved performance and cost savings.

---

**Company**
Omega-p, Inc.
258 Bradley Street
New Haven, CT 06510-1106

**Title:**
Electron Gun and Beam Collector for a 650-kW, 1.3-GHz Low-Voltage Multi-Beam Klystron for the Project-X Pulsed Linac

**Summary:**
The quest for understanding the origin of the universe requires continued search for elementary particles, for which high-energy accelerators are necessary tools. This project is to develop the

electron gun and electron beam collector for a high-power microwave amplifier with simplified design and thus allow improved performance and cost savings.

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

**Company**
American Undulator As Alexander Mikhailichenko
909 Triphammer Rd
Ithaca, NY 14850-2508

**Title:**
Accelerator Design that can Provide Very High Gradient with Acceleration Structures Fabricated with integrated Circuit Technology

**Summary:**
The far-term goal of this research is in development and design of accelerator able to provide >1 GeV/m for electrons. This goal will be reached by usage of Si micro-structure made with Lithographic technology common in micro-circuit fabrication. In this project we optimized the dimensions of micro-structure in a view of real technology available at mostly Nano-factories located around. Numerical 3D calculations of swept laser beam illuminated micro-structure will be performed. Design will be ready for fabrication in a Second phase, if awarded.

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**STTR Project**
**Company**
Incom Inc.
294 Sturbridge Road
Charlton, MA 01507-5238

**Title:**
Drive Systems for Photonic Bandgap (PBG) Accelerators

**Summary:**
High-energy physics needs shorter wavelengths and higher energies at much lower cost to probe the fundamental structure of matter. Miniature photonic-bandgap accelerators have potential to increase power and performance while drastically reducing machine size and cost, enabling breakthroughs in high-energy physics, industrial measurement, medical research and diagnostic technology.

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**STTR Project**
**Company**
Muplus, Inc.
45 Jonquil Lane
Newport News, VA 23606-

**Title:**

Complete Muon Collider Cooling Channel Design and Simulations

**Summary:**
This project will develop the theoretical principles and numerical simulation tools that are needed for the optimization of beam cooling systems for an energy-frontier muon collider that would complement and eventually overtake the LHC.

---

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

**Title:**
The Next Generation Photoinjector

**Summary:**
This project will develop industrially the next generation electron source, an important tool for advancing future scientific discoveries and American scientific leadership in the world.

---

**Company**
Sti Optronics, Inc.
2755 Northup Way
Bellevue, WA 98004-1495

**Title:**
1-Meter Capillary Discharge for Laser Wakefield Acceleration

**Summary:**
A new type of capillary discharge will be developed for advanced high-energy electron accelerators. Applications for these accelerators include industrial processing, medicine, homeland defense, and high-energy physics.

---

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

**Title:**
Modeling tools and techniques for dielectric laser accelerators

**Summary:**
Future generations of high-energy particle accelerators, used to study the fundamental nature of matter, will likely be powered with lasers. Designs are being developed to enable powerful, efficient laser-driven structures, which can significantly reduce the cost and size of accelerator systems.

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

**Company**
Alameda Applied Sciences Corporation
3077 Teagarden Street
San Leandro, CA 94577-5720

**Title:**
Linear Gas Jet with Tailored Density Profile

**Summary:**
This project will demonstrate a test bed to reduce the cost of laser plasma accelerator development. Laser plasma accelerators have the potential to reduce the cost and size of particle accelerators for medicine, industry and science.

---

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

**Title:**
Advanced Klystrons for High Efficiency Accelerator Systems

**Summary:**
This project will develop a type of klystron that will drive particle accelerators much more efficiently. The klystrons will be useful for research and medical accelerators, and other DoD and commercial applications.

---

**Company**
Diversified Technologies, Inc.
35 Wiggins Ave
Bedford, MA 01730-2345

**Title:**
High-Energy-Density Storage Capacitors

**Summary:**
Increasing the energy density of available high voltage storage capacitors will reduce the burdensome volume of capacitor banks in pulsed power systems, as well as enable longer and more easily regulated pulsing for klystron modulators.

---

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

**Title:**
Complete Multipacitor Suppression in Dielectric Loaded Accelerators using a Solenoid Field

**Summary:**
Dielectric based particle accelerators offer the possibility of reduced cost and higher efficiency for applications in industry, medicine, and scientific research. We propose to study ways to eliminate an undesirable form of energy absorption that is currently the main obstruction to widespread use of these devices.

---

**Company**
Inta
2281 Calle de Luna
Santa Clara, CA 95054-1002

**Title:**
High Power S-Band Vacuum Dry Load for SLAC Linac using Innovative Highly Conductive Materials and Novel Manufacturing Technologies.

**Summary:**
High peak power RF loads are employed to terminate the remaining energy of RF sources in high-energy linear particle accelerators. The proposed project will develop high power loads that can reliably terminate the increased power of modern RF sources.

---

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

**Title:**
400 MHz LHC Crab Cryomodule with HOM Dampers, Tuners and Couplers

**Summary:**
Recent accelerator upgrades require novel superconducting cavities that deflect the beam to increase the efficiency of the system. This proposal will develop the key components that allow these new deflecting cavities to operate at superconducting temperatures nearly 450 degrees below zero.

---

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

**Title:**
Seamless Nb Tubes for SRF Cavities

**Summary:**
Increased deformability in high RRR Nb tube for superconducting radio frequency (SRF) cavities in linear accelerators will be achieved by an improved materials processing method to refine the microstructure. The improved microstructure will be produced by severe plastic deformation processing methods applied to reduce the average grain size, improve microstructural uniformity and texture, improve material ductility, improve SRF cavity performance, and lower SRF cavity manufacturing costs.

---

**Company**
Silicon Power Corporation
275 Great Valley Parkway
Malvern, PA 19355-1308

**Title:**
MegaWatt Power Electronic Switching Modules with Breakthrough Advances in Stray Inductance, Switching Speed and Energy Density, for Applications with Pulse Widths Down to the Sub-Microsecond Range

**Summary:**
The industry of high voltage power electronic semiconductor switches, created and once dominated by the US, is now almost entirely controlled by foreign interests. We propose to develop a device that will displace all others in many applications and eliminate significant waste of electric energy in large power electronic converters.

---

**Company**
Ultramet
12173 Montague Street
Pacoima, CA 91331-2210

**Title:**
Advanced Manufacturing and Testing of Seamless High-Purity Niobium Superconducting Radio Frequency Cavities

**Summary:**
Large quantities of high-purity niobium radio frequency cavities are needed for particle accelerators in fields as diverse as high-energy physics and airport security. Advanced chemical vapor deposition processing is being developed for economical fabrication of seamless high-purity niobium cavities.

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

**Company**
Hjc Enterprise LLC
5 Badgley Dr

New Providence, NJ 07974-2501

**Title:**
On The Use of Highly Densified Bi-2212 Wire for Superconducting Magnet Application

**Summary:**
High-field magnets are essential components of devices used in a number of advanced fields of science, such as NMR and ICR (widely used in drug discovery), and particle accelerators used in high energy physics. This study seeks to determine how to achieve good quality powder packed filaments in cables and magnets.

---

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

**Title:**
Gun-Drilled Tube Type Nb3Sn with non-Cu Jc values over 3000 A/mm2 (12T-4.2K)

**Summary:**
This project will develop a much improved Nb3Sn superconductor wire for next generation High Energy Physics accelerator magnets, and for commercial applications such as MRI, NMR and accelerators for medical applications.

---

**Company**
Metamateria Technologies, LLC
1275 Kinnear Road
Columbus, OH 43212-1155

**Title:**
High Tc Bi2Sr2CaCu2Ox superconducting powder and wires for high field magnets

**Summary:**
This SBIR program will develop improved process methods for preparing Bi 2212 powder synthesized using solution based techniques production of high temperature superconducting wire.

---

**STTR Project**
**Company**
Particle Beam Lasers, Inc.
18925 Dearborn Street
Northridge, CA 91324-2807

**Title:**
Magnet Coil Designs Using YBCO High Temperature Superconductor (HTS)

**Summary:**
This SBIR will advance the use of an exciting new technology for generating magnetic fields. Immediate applications in particle physics are expected and numerous areas of technology could benefit if the work is successful. Young researchers will have the opportunity to contribute significantly to the work of this SBIR.

---

**Company**
Supercon, Inc.
830 Boston Turnpike
Shrewsbury, MA 015545-338

**Title:**
A Ta Doped ITT Type Nb3Sn Conductor with Improved Fabrication Characteristics

**Summary:**
The magnets for the next generation of high energy physics and fusion machines will require the development of superconducting wire capable of high performance at very high magnetic fields. This project seeks to develop a method for improving the manufacture of Nb3Sn superconductor that will produce a lower cost and high performance product

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**TOPIC: High Energy Physics Detectors and Instrumentation**

**Company**
Arradiance, Inc.
142 North Road
Suite F-150
Sudbury, MA 01776-1142

**Title:**
Novel Event Counting Microchannel Plate Detectors Capable of Operation at Cryogenic Temperatures

**Summary:**
Arradiance proposes development of novel event counting Microchannel Plates (MCPs) capable of operation at cryogenic temperatures. These devices will be capable of unique single photon/electron/alpha/ion detection with very high spatial and temporal resolution.

---

**Company**
Coating Technology Solutions Inc.
36 B Munroe Street
Somerville, MA 02143-1009

**Title:**
High Efficiency Diamond Detectors

**Summary:**
Recently, CTS Inc achieved near state of the art performance of diamond detectors in both single crystal and polycrystalline forms. This project will develop microwave plasma CVD deposition methods targeting commercially viable diamond detectors by addressing both detector performance and overall deposition rates.

---

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

**Title:**
Low Radioactivity NaI for Dark Matter Studies

**Summary:**
The proposed research will investigate the promising high purity scintillator material, NaI, that will have a major impact in scientific studies, nuclear non-proliferation, medical imaging, scientific studies as well as commercial applications.

---

**STTR Project**
**Company**
Sinmat Inc.
1912 NW 67th Place
Gainesville, FL 32653-1649

**Title:**
Novel Rapid Chemical Mechanical Polishing (CMP) Process for Fabrication of High Performance CVD Diamond Particle Detectors

**Summary:**
The ultra-smooth CVD diamond crystals based radiation detectors will represent a significant advancement in the fields of high energy physics, X-ray physics and nuclear physics, nuclear power industry and home land security. Ultra-smooth diamonds will help the miniaturization of computer process and other electronic appliances.

---

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

**Title:**
Large Area GaN-Based Avalanche Photodiodes for Operation in Extreme Environments

**Summary:**
Wide bandgap GaN-based materials are the most promising semiconductors for solar-blind ultraviolet (UV) detectors, particularly in those applications where the UV components of light

needs to be analyzed in the presence of large visible and/or infrared background. This project will develop GaN-based avalanche photodiodes (APDs) as a lower cost, robust and compact alternative to bulky photomultiplier tubes for sensitive and fast detection of light in many applications. Other advantages of the proposed GaN-based APDs include capability to operate in harsh environments, including very high temperatures and high radiation levels, and relative immunity to high magnetic fields, both of which are essential for future DOE high energy physics experiments.

---

**Company**
Vega Wave Systems
1275 West Roosevelt Road, Suite 104
West Chicago, IL 60185-4815

**Title:**
An Optical Bus for Level 1 Trigger Designs in Particle Physics Detectors

**Summary:**
This project will develop very high speed optical communications links based on radiation-tolerant external optical modulators for the next generation of high energy physics particle detectors. Spin-offs are expected to have significant commercial value by improving data transfer and network traffic for large computer network systems, including the internet.

---

**Company**
Voxtel, Inc.
15985 NW Schendel Avenue
Suite 200
Beaverton, OR 97006-

**Title:**
Large Area, Low Dark Count VIS-UV Solid State Photomultipliers

**Summary:**
A new photodetector is being developed. The detector has greater sensitivity and lower noise than current silicon based photodetectors. The innovation allows large high performance photon counting detectors to be made at low cost.

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**TOPIC: Nuclear Physics Software and Data Management**

**Company**
Crossfield Technology LLC
9390 Research Blvd
Suite I200
Austin, TX 78759-7366

**Title:**

Software Architecture for High-Speed Synchronous Network Instrumentation

**Summary:**
This project will develop a distributed network instrumentation system that provides high-speed, low-latency data transfer from detectors to a computer or data storage system, and is scalable from one to thousands of channels. The innovative architecture uses commodity network components, and IEEE standards for time synchronization and detector plug-and-play.

---

**Company**
Skutek Instrumentation
410 Linden Street
Rochester, NY 14620-2442

**Title:**
Time-synchronized Network Architecture for Data Acquisition

**Summary:**
This project will advance digital signal processing electronics which will be cheaper and more flexible than current solutions. Future applications of our products will include basic science, astrophysics, Homeland Security, and education.

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

**Company**
Advanced Science And Novel Technology Company
27 Via Porto Grande
Rancho Palos Verdes, CA 90275-4878

**Title:**
Multi-Channel Time-to-Digital Converter for Pulse Shape Analysis

**Summary:**
The proposed multi-channel time-to-digital converter provides highly accurate representation of time intervals in the form of binary codes. It features eight conversion channels with a possibility to deliver full information about eight sampling points on the input signal and is beneficial for the DOE experiments, as well as military and commercial applications in medical, space, aircraft, and automotive industries.

---

**Company**
Pacific Microchip Corp.
3916 Sepulveda Blvd. #108
Culver City, CA 90230-4650

**Title:**
Transceiver ASIC for 100Gbps Detector Data Link

**Summary:**
This project will develop a low power radhard wide temperature range 100Gbps transceiver ASIC. This ASIC will be compliant with the 100Gbps Ethernet (100GbE) standard and will satisfy the data throughput needs of most demanding detector interfaces of nuclear physics instruments such as those required at FRIB.

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**STTR Project**
**Company**
Zipton Labs LLC
1475 N Scottsdale Road STE 200
Scottsdale, AZ 85257-3538

**Title:**
Wide Bandgap Gallium Phosphide Detectors

**Summary:**
This project will demonstrate the feasibility of avalanche photodiodes made from gallium phosphide grown on silicon virtual substrates. To increase material quality and decrease dark-current noise, gettering will be performed on the substrate and epilayer. The photodetectors will give superior UV quantum efficiencies to that of UV-sensitized silicon photodiodes at a price point much lower than other wider bandgap alternatives.

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**TOPIC: Nuclear Physics Accelerator Technology**

**Company**
Alameda Applied Sciences Corporation
3077 Teagarden Street
San Leandro, CA 94577-5720

**Title:**
MgB2 coatings for future SRF accelerators

**Summary:**
This project will increase the state of the art in MgB2 film deposition using a novel dual cathodic arc vacuum source to deposit MgB2 on Nb substrates in a single step.

---

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

**Title:**
Ferroelectric Based High Power Components for L-Band Accelerator Applications

**Summary:**
This project will develop a new electronic device to optimize the power in particle accelerators. The key component is a bar of a "smart" material that changes its properties with an applied electric field.

---

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

**Title:**
RF Heating Modeling Tools for Electron Cyclotron Resonance Ion Sources

**Summary:**
This project will develop software that will decrease the cost of operating sources of highly charged ions that are used in nuclear physics research as well as applications such as proton therapy.

---

**STTR Project**
**Company**
Hyper Tech Research, Inc.
539 Industrial Mile Road
Columbus, OH 43228-2412

**Title:**
Development of MgB2 Superconducting Coils for Nuclear Physics Applications

**Summary:**
This program pursues the improvement of magnesium diboride superconducting coils for nuclear physics magnet systems. It can improve and reduce the cost of these systems. The R&D will also help progress the use of magnesium diboride superconductor magnets for commercial MRI's, superconducting fault current limiters, and offshore wind turbine generators.

---

**Company**
Innosense LLC
2531 West 237th Street
Suite 127
Torrance, CA 90505-5245

**Title:**
Refractory Oxides with Tunable Porosity and Geometry as Versatile Fast-Release Solid Catchers for Rare Isotopes

**Summary:**
This project will support the DOE program objectives, which aim to develop refractory, solid catchers for the efficient production of rare isotopes of single-species molecular vapors. The

proposed technology will help to promote understanding of how stars explode or how elements from iron to uranium are created.

---

**Company**
Muons, Inc.
552 N. Batavia Ave
Batavia, IL 60510-0000

**Title:**
Ribbon Electron Beam Profile Monitor for Bunched Beam Tomography

**Summary:**
New beam tomography systems are being developed to diagnose intense proton beams for the Spallation Neutron Source and other scientific and commercial accelerators.

---

**STTR Project**
**Company**
Radiabeam Technologies, LLC.
1717 Stewart Street
Santa Monica, CA 90404-4021

**Title:**
Advance Additive Manufacturing Method for SRF Cavities of Various Geometries

**Summary:**
This project will manuafacture a superconducting accelerator with innovative additive fabrication techniques. This promises to be a less-expensive, more reliable device for imaging and analysis applications of interest to homeland security as well as industrial and academic programs.

---

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

**Title:**
GaAsSb/AlGaAs Superlattice High-Polarization Electron Source

**Summary:**
Polarized electron emitters isolate and enhance one of the two naturally occuring forms of the electron subatomic particle. This program will create a new, highly efficient source of polarized electrons for use in high energy particle physics research.

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**TOPIC: Nuclear Physics Instrumentation, Detection Systems and Techniques**

**Company**
Applied Diamond, Inc.
3825 Lancaster Pike
Wilmington, DE 19805-1559

**Title:**
Thin Diamond for Time-of-Flight Detectors

**Summary:**
Man-made diamond quality has improved sufficiently to allow the manufacture of high performance radiation and particle detectors. This project will investigate thin film diamond preparation techniques to further expand potential applications for this radiation hard material.

---

**Company**
Hypres, Inc.
175 Clearbrook Road
Elmsford, NY 10523-1109

**Title:**
Digital SQUID Magnetometers for Read-out of Detectors and Magnetic Particles

**Summary:**
Ultra-low noise and extremely sensitive superconducting sensors developed under this program can be used as high-resolution imaging sensors. These digital sensors in multi-channel systems have applications in non-invasive biomedical instruments such as magnetocardiograms, magnetoencephalograms, and in non-destructive evaluation for detection of corrosion and cracks in metals.

---

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

**Title:**
Multi-Modality Nuclear Spectroscopy

**Summary:**
The proposed research will develop a nuclear detector that will find wide use in nuclear and particle physics, homeland defense, oil well logging, non destructive testing, nuclear treaty verification and environmental remediation.

---

**Company**
Technology Assessment And Transfer, Inc.
133 Defense Hwy, Suite 212
Annapolis, MD 21401-8907

**Title:**
Nanostructured Ceramic LSO Scintillators Using Dynamic Powder Compaction

**Summary:**
The goal of this project is develop a polycrystalline scintillator material (Lu2SiO5) for nuclear physics applications. Such a process methodology would enable more cost effective manufacturing method for this important scintillator material and open up new avenues of design for both nuclear accelerator facilities and medical scan applications.

---

**Company**
Tungsten Heavy Powder, Inc.
7430 Trade Street
San Diego, CA 92121-2410

**Title:**
Development and Testing of New Tungsten Based Absorber Materials with Accordion Geometries for Nuclear Physics Applications

**Summary:**
The proposed research effort would fabricate custom accordion shaped tungsten sheets. In the future, these preformed absorber plates will provide a simple and inexpensive material for the construction of large scale particle detectors in nuclear, high energy and space physics experiments, and for shielding purposes. It may also find commercial applications in x-ray instrumentation, medical imaging, baggage and container inspection, and material analysis.

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**TOPIC: Nuclear Physics Isotope Science and Technology**

**Company**
Alameda Applied Sciences Corporation
3077 Teagarden Street
San Leandro, CA 94577-5720

**Title:**
High Separative Power Vacuum Arc Centrifuge

**Summary:**
This project will demonstrate a robust, cost effective isotope separation technology to efficiently produce rare isotopes for medical diagnostics, research and industrial applications.

---

**Company**
Clear Vascular, Inc.
21 Waterway Avenue
Suite 225
The Woodlands, TX 77380-3099

**Title:**
Production of Commerical High Specific Activity Sn-117M Radiochemical and Chelates

**Summary:**
This project will provide new methods for producing commercial quantities of radiochemicals that will have broad applications for and greater efficiency in the treatment of various cancers, vulnerable plaque, autoimmune and other diseases.

---

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

**Title:**
Commercial Superconducting Electron Linac for Radioisotope Production

**Summary:**
There is critical need for a domestic supply of radioisotope production for medical and research uses. This project will develop a superconducting electron linear accelerator for use as a cost effective isotope producer.

---

**Company**
Weinberg Medical Physics LLC
5611 Roosevelt Street
Bethesda, MD 20817-6739

**Title:**
Semi-automated Lab-on-a-Chip for Dispensing Ga-68 Radiotracers

**Summary:**
This project will solve a technical problem that is hindering American progress in molecular medicine, and restricting US citizens from receiving optimal diagnostic care. Specifically, the project deals with a mother/daughter generator of positron-emitting radiotracers (Ge-68/Ga-68).

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