FY 2013 Phase I Release 1 SBIR/STTR Award Selections*

By Topic

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***The following small businesses have been selected for award; however, all awards are pending until negotiations are completed between each small business and the DOE.**

Topic: 1 - Advanced Network Technologies and Services

Company

Pollere, Inc.
325M Sharon Park Drive #214
Menlo Park CA, 94025-6805

Title

Efficient Distributed Collection and Analysis of Packet Delay Data for Secure Role-Based Export and Topological Mapping

Summary

The objective is to create a methodology for robustly and non-intrusively measuring the increasingly important internet performance metric of queue delay. In addition, an approach to secure the data and its collection point from unauthorized use will be developed.

Company

Freedom Photonics, Llc
90 Arnold Place
Santa Barbara CA, 93117-3119

Title

Integrated Coherent Receiver for 112 Gbps Compact Optical Modulation Analyzer

Summary

The objective is to develop an innovative, low cost, small size and high performance Coherent Optical Receiver, based on its Photonic Integrated Circuit (PIC) technology. This advanced Coherent Optical Receiver will enable the implementation of sophisticated handheld optical communications test equipment, supporting the installation, maintenance, and expansion of the US broadband communications network, while strengthening the US technological base.

Company

Nanoprecision Products, Inc
411-B Coral Circle
El Segundo CA, 90245-4622

Title

Fast-Track : Low-Cost Optical Interconnects for Netwroks and High-Performance Computing

Summary

The objective is to develop a suite of precision manufacturing innovations that enable domestic production of optical interconnects to be made in high-volumes at low cost for both commercial and military applications. Domestic manufacturing base for producing telecommunication components has been in decline with ever increasing dependence on foreign suppliers.

Company

Subway Labs, Inc.
108 East 4th St. Apt. 2
New York NY, 10003-0721

Title

Subway Labs: Big Data Tools for Energy Materials R&D

Summary

The objective is to develop big data tools to accelerate the development of new energy materials and devices. Our cloud-based software tools help bring new batteries, solar cells, fuel cells, and capacitors to market faster.

Topic: 2 - Increasing Adoption for HPC Modeling and Simulation in the Advanced Manufacturing and Engineering Industries

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Company

Engineering Mechanics Corporation of Columbus
3518 Riverside Drive
Columbus OH, 43221-1735

Title

Adoption of High Performance Computational (HPC) Modeling Software for Widespread Use in the Manufacture of Welded Structures

Summary

The objective is to leverage an existing, state-of-the-art software code VFT® used currently to design and model large welded structures prior to fabrication to a broader range of applications and products for widespread use by small and medium-sized companies. The VFT® code helps control distortion, minimize residual stresses, and pre-determine welding parameters such as weld-sequencing, pre-bending, and thermal-tensioning, using material properties, consumable properties, etc. as inputs. By doing this, manufacturing companies avoid costly design changes after fabrication.

Company

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

Title

System Modeling and Digital Analysis Ecosystem (SMDAE)

Summary

The objective is to develop a commercial a turnkey HPC solution that enables an “artisan process” of digital experimentation more appropriate for the “missing middle” manufacturing.

Company

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

Title

HPC Modeling to Aid Accelerator Component Manufacturing

Summary

The objective is to develop user interfaces that will give accelerator designers a useful tool that will reduce time and cost of new superconducting accelerators. Computer modeling and simulation is necessary to design sophisticated superconducting accelerators, yet current modeling and simulation software is too difficult for non-computer experts to use effectively.

Company

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

Title

Optimal production planning, sourcing, distribution and routing for complex energy intensive manufacturing companies using High Performance Computing

Summary

The objective is to address the problem of complexity in using readily available data for supply chain optimization in manufacturing and logistics. It is expected to result in increased supply chain efficiency, energy independence, reduced harmful emissions, increased global competitiveness, and job creation.

STTR Project

Company

Predictive Design Technologies, Llc
1207 Chapel Hill Road
Starkville MS, 39759-9236

Title

Optimization Using Metamodeling in the Context of Integrated Computational Materials Engineering (ICME)

Summary

The objective is to develop innovative meta-modeling (quick response) toolkits for the manufacturing industry to improve manufacturing quality and efficiency through virtual manufacturing, which could be run on laptop computers and are calibrated with the results from large-scale finite element simulations that are run in high performance computing environments.

STTR Project

Company

Rnet Technologies, Inc.
240 W Elmwood Dr
Dayton OH, 45459-4248

Title

Virtual Accelerator Support for HPC Clouds

Summary

The objective is to develop a virtual accelerator framework that enables Cloud- based HPC service providers to offer cost-effective, elastic and fault-tolerant accelerator-based HPC ser- vices. Such product is crucial in facilitating the adoption of HPC software-as-a-service in manufacturing and engineering industry.

Company

Totalsim Llc
7003 Post Road
Dublin OH, 43016-8360

Title

Web-based CFD Vertical Applications Using Cloud Based HPC

Summary

The objective is to develop Web Based Fluid Flow simulations. This will allow the broader adoption of advanced Modeling and Simulation technology across small and medium sized engineering and manufacturing companies helping reducing development costs and increasing productivity.

STTR Project

Company

Argo Navis Technologies, Llc
999 Windcroft Pl
Annapolis MD, 21401-6578

Title

Automated Cache Performance Analysis and Optimization in Open|SpeedShop

Summary

The objective is to enable Open|SpeedShop to gather memory reference latency information for specific instructions and memory addresses, and to gather and display this information in an easy-to-use and intuitive way to aid performance analysts in identifying problematic data structures in their codes. This tool

will be primarily designed for use in the supercomputer domain as well as grid, cluster, cloud-based parallel e-commerce, and engineering systems and middleware.

Company

Em Photonics
51 East Main Street
Newark DE, 19711-4685

Title

Unified, Cross-Platform, Open-Source Library Package for High-Performance Computing

Summary

The objective is to develop an open source, unified set of fundamental libraries for use on hybrid High Performance Computing systems and provide baseline functionality for common library routines written in OpenCL that will be cross platform and open source.

Company

Paratools, Inc
2836 Kincaid Street
Eugene OR, 97405-

Title

TAU Commander: An Intuitive Interface for the TAU Performance Analysis System

Summary

The objective is to deliver TAU Commander, a software user interface for TAU that simplifies TAU usage to improve productivity and bring TAU to new application domains. The TAU Performance System® is a powerful and complex software tool that computer experts use to improve software performance on leadership computing systems.

Company

Pmac Laboratories, Inc.
9747 Business Park Ave
San Diego CA, 92131-1660

Title

Performance Optimization and Porting Tools for Energy-Efficient High Performance Computing Architectures

Summary

The objective is to create software development tools for the "ARM" computer processor. ARM, which is highly energy-efficient and extensively used in smart phones and tablet computers such as the iPad, is now being used for large-scale "cloud" computing centers and supercomputers. The software tools developed by

PMaC will facilitate the transition of the ARM processor from mobile computing devices to large-scale, energy efficient data centers and supercomputers.

Company

Argo Navis Technologies, Llc
999 Windcroft Pl
Annapolis MD, 21401-6578

Title

Parallel Tools GUI Framework

Summary

The objective is to develop the base collection of libraries and plug-ins that can be utilized by parallel tool developers to quickly create full-featured graphical user interfaces. This includes creating graphical controls and data visualizations that parallel tools commonly require to make their GUIs user-friendly and more intuitive, and a help system that puts everything from reference materials to video tutorials at the user's fingertips.

Company

Computational Simulation Software, Llc
17 North Merchant Street, Suite 3
American Fork UT, 84003-1601

Title

Robust Algorithms for Managing Large and Complex Multi-Volume Assembly Meshes

Summary

The objective is to develop and enhance computer software to facilitate faster generation of computer models for simulation, thus allowing more widespread and faster utilization of High Performance Computing to improve engineering analysis and design.

Company

Em Photonics
51 East Main Street
Newark DE, 19711-4685

Title

Intuitive Open Platform Usage of ASCR Resources in NumPy

Summary

The objective is to integrate a GPU-enhanced library to increase the speed of Python computations by tenfold or more and increasing the ability of Python to be used simultaneously for both prototyping and

deployment, which often requires separate programs coded in different languages.

Company

Illinoisrocstar Llc
60 Hazelwood Drive
Champaign IL, 61820-

Title

Infrastructure for Multiphysics Software Integration in High Performance Computing-Aided Science and Engineering

Summary

The objective is to extend and use a multi-physics integration infrastructure to generate a development system. That is, high-fidelity computer simulation can be made simpler and less expensive by using a common infrastructure that enables industry and government users to unite software code modules from different commercial and proprietary sources.

Company

Jema Technologies Llc
1942 University Ave Ste 306
Berkeley CA, 94704-1244

Title

User-Friendly Software Suite for HPC Grazing Incidence Scattering Modeling and Simulation Code

Summary

The objective is to develop a software tool to facilitate fast modeling and simulation of materials in order to lead to improved products. This offers one route for making GISAXS a more widely accessible technique for measuring the structure of novel materials created by the advanced manufacturing and engineering industries.

Company

Protection Engineering Consultants, Llc
4203 Gardendale, Suite C112
San Antonio TX, 78229-

Title

Hardening of CTH for Industry and Government Use

Summary

The objective is to develop software tools to facilitate the application and accessibility of CTH, a powerful modeling tool developed by Sandia National Laboratories. Industry and government will use these tools to

develop structures and devices that increase public safety and support military capabilities.

Topic: 3 - Technology to Support BES User Facilities

STTR Project

Company

Incom Inc.
294 Sturbridge Road
Charlton MA, 01507

Title

Advanced Compact X-Ray Spectrometer with High Resolution and Efficiency

Summary

The objective is to investigate a new x-ray spectrometer detector design that is a more efficient, lower-cost, high-resolution detection system with excellent background suppression. It will be based on a new 'pre-collimation' x-ray optic. The small size and emittance angle of the pre-collimation optic allow additional optics to further collimate the x- rays such that a plane crystal can function as a wavelength selective element.

STTR Project

Company

Xradia
4385 Hopyard Road
Pleasanton CA, 94588-2758

Title

Development of Ceramic Scintillators for High Speed, Ultra-High Resolution X-Ray Imaging Detectors

Summary

The objective is to develop and commercialize ceramic based x-ray scintillators for the next generation 3D x-ray microscopes for milli-second, sub-micron resolution imaging to study, understand and develop new materials and processes in the fields of energy storage and generation, security and semiconductors to name a few.

Company

Kapteyn-murnane Laboratories Inc.
1855 South 57th Court
Boulder CO, 80301-2811

Title

Direct Diode Pumped 100-200kHz (200W) Ti:Sapphire Ultrafast Laser System for Cost Effective EUV Generation in Hollow Waveguides.

Summary

The objective is to develop this concept into an economical beam-monitoring product to provide to the accelerator community that increases the detection resolution, hardware and software development, and side by side comparison with well accepted but invasive deflecting cavity technology.

Company

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

Title

3 Micron High Energy Ultrafast Fiber Laser for X-Ray Science

Summary

The objective is to develop a high energy 3 micron ultrafast fiber laser system 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.

Company

Advanced Energy Systems, Inc.
27 Industrial Blvd.
Medford NY, 11763-2286

Title

A Design Study for Megawatt Class Waveguide Input Coupler for Synchrotron Light Source Superconducting Cavities

Summary

The objective is to develop a new higher power RF window to serve as an upgrade to waveguide input couplers for superconducting cavities. The goal is to build a test article which can operate with a peak power of one megawatt.

Company

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

Title

Energetic Condensation Coating of Cu on Stainless Steel for High Power Couplers

Summary

The objective is to use existing cathodic arc deposition hardware to provide an improvement to existing SRF accelerator components. Improved quality RF couplers could result in lower operations and maintenance costs for accelerator user facilities through decreased quality assurance and replacement costs.

Company

Allcomp Corporation
209 Puente Avenue
City of Industry CA, 91746-2304

Title

Carbon Foam for Beam Stop Application

Summary

The objective is to develop a new isotropic graphitic foam material for science-based accelerator experiments and space-based heat spreaders and provide high conductivity material for efficient heat transport in renewable energy applications.

Company

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

Title

Development of an In-situ Environmental Fluid Cell for Synchrotron X-ray Microscopy

Summary

The objective focuses on the development of a tool for materials studies in the environment those materials operate using soft X-ray microscopy. Continuous miniaturization of devices surrounding people demands for improvements in materials design and manufacturing, which in turn requires high resolution compositional and chemical analysis.

Company

Lyncean Technologies, Inc.
370 Portage Ave.
Palo Alto CA, 94306-2244

Title

Fast-Track : CLS Beam Development

Summary

The objective is to understand and improve the operation of our low-energy (10’s of MeV) electron storage ring. The development of this technology will directly contribute to enhanced performance of a new type of x-ray source which is a spin-off of accelerator research and is now a commercial product. Abstract

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Company

Xradia
4385 Hopyard Road
Pleasanton CA, 94588-2758

Title

Cryo Correlative Light Microscope for X-ray Microscopy Studies

Summary

The objective is to develop a scanning con-focal optical microscope with cryogenic sample handling that works seamlessly with x-ray microscopes delivering structural and functional information from radiation sensitive samples. Research application areas include energy materials such as batteries and organic photovoltaics as well as environmental science such as soil remediation.

Topic: 4 - Radio Frequency (Rf) Devices and Components for Accelerator Facilities

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STTR Project

Company

Radiabeam Systems, Llc.
1713 Stewart Street
Santa Monica CA, 90404-4021

Title

RF-Free Chirp Removal Using Longitudinal Wakefields

Summary

The objective is to develop technology that enables the next-generation of electron-beam based x-ray sources at reduced cost and size while increasing extracted efficiency by utilizing passive structures.

Company

Euclid Techlabs, Llc
5900 Harper Rd. #102

Solon OH, 44139-1866

Title

Power Tunable High and Narrowband THz source for THz Pump – X-ray Probe Experiments

Summary

The objective is to develop a new kind of high power high frequency compact source of terahertz (one trillion cycles per second) electromagnetic waves. This technology has numerous applications in medicine, basic research, defense, and communications.

Company

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

Title

Improving Ion Source Antenna Lifetime for the Spallation Neutron Source

Summary

The objective is to use high-performance computing software packages Vorpal and Nautilus to perform innovative simulations of plasma interactions with rf antennas in ion sources using novel modeling capabilities to develop accurate simulations that are otherwise not achievable using traditional Particle-In-Cell plasma simulation algorithms.

Topic: 5 - Advanced Sources for Accelerator Facilities

Company

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

Title

Metal Plasmonic Nanostructures Functionalized by Atomic Layer Deposition of 2A Metal-Oxides for Robust High-Quantum-Efficiency Ultrafast Photocathodes

Summary

The objective is to develop a new kind of ultra-fast, high quality photocathode based electron gun that can be driven by an inexpensive, "green" laser. This technology will become instrumental in electron microscopy for basic research and vacuum electronics for communications, remote sensing, and radar applications.

Company

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

Title

Development of a High-brightness Field-Emission Superconducting RF Gun

Summary

The objective is to develop a new high-brightness and high-current electron source required for new kinds of electron microscopes, high-quality x-ray sources, and Free Electron Lasers.

Company

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

Title

Nano-Patterned Cathode Surfaces for High Efficiency Photoinjectors

Summary

The objective is to use the latest nanofabrication technologies to manufacture sources with dramatically improved efficiency and lifetimes since present electron beam sources rely on emission sources that have poor lifetimes or inadequate efficiency.

Company

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

Title

Fast-Track : Laser Wire Scanner for Energy Recover Linacs

Summary

The objective is to develop a cost-effective approach to developing a vital diagnostic device, the laser wire scanner (LWS) for high current electron accelerators. The immediate benefit of the proposed system will be improved capabilities and expedited development of the next generation high power electron sources for research, industrial and defense applications.

Topic: 6 - Ancillary Technologies for Accelerator Facilities

Company

Wang Nmr Inc.
550 North Canyons Parkway
Livermore CA, 94551-9472

Title

Development of a High Temperature Superconducting YBCO for Ultrashort Period (< 10 mm) Undulators

Summary

The objective is to design a race track YBCO coil with a minimum bending diameter of 12.5 mm for both tension and compression. We will also complete the cryostat design for the YBCO undulator coils. The cryostat will have a clear cold beam aperture of 3 mm. Furthermore, we will develop a 5-pole prototype YBCO SCU and perform test in an open dewar.

Topic: 7 - Instrumentation for Advanced Chemical Imaging

Company

Advanced Energy Systems, Inc.
27 Industrial Blvd.
Medford NY, 11763-2286

Title

Ultrafast Electron Diffraction Device for Time-Resolved Chemical Imaging

Summary

The objective is to develop a single-shot UED device for ultrafast electron diffraction experiments that will enable the study of femtosecond time-resolved atomic structures. At this time-scale, the dynamics of the atomic-scale molecular structure subsequent to an electronic or vibration excitation are a key aspect of chemical dynamics as well as invaluable to applications in materials processing.

Topic: 8 - Instrumentation for Electron Microscopy and Scanning Probe Microscopy

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Company

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

Title

In-Situ Transmission Electron Microscope Liquid Specimen Holder with Integrated Temperature and Acidity Sensors

Summary

The objective is to develop a tool to enable electron microscopy imaging studies while measuring and controlling pH and temperature at the nano-scale. The ability to observe and control electrochemical and bio-mineral processes and measure pH levels and temperature is critical to the advancement in understanding of these fundamental processes.

Company

Sciencetomorrow, Llc
2525 E University Dr
Phoenix AZ, 85034-6912

Title

Direct Digital Secondary Electron Signal Acquisition Probe for Scanning Electron Microscope.

Summary

The objective is to develop capability of accurate measurement in nanometer scale. This will improve electronics, medical devices, chemical processes, and energy generation by more accurate control of materials in nanoscale.

Company

Advanced Diamond Technologies, Inc.
48 E. Belmont Drive
Romeoville IL, 60446-1764

Title

Fast-Track : Conductive Diamond Probes for Scanning Elecrochemical Microscopy

Summary

The objective is to develop a class of atomic force microscopy nano-probes necessary for simultaneous topographic and electrical imaging in conductive liquids, such as needed for advanced biological and battery electrode studies. The nano-probes use conductive diamond for its low wear and chemical resistance.

Company

Primenano
35 Lerida Ct
Portola Valley CA, 94028-7424

Title

Developing Quantitative Capabilities for a Scanning Microwave Impedance Microscope

Summary

The objective is to develop a probe that can be used with a variety of commercial imagers, adding a new material characterization capability important to a wide range of energy-related technologies. Currently,

there is no convenient method for determining the electrical properties of nanometer-sized regions of a material.

Topic: 9 - Instrumentation and Tools for Materials Research Using Neutron Scattering

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STTR Project

Company

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

Title

Advanced Energy-Resolving Imaging Detectors for Applications at Pulsed Neutron Sources

Summary

The objective is to develop improved position sensitive detectors capable of time-tagging multiple neutrons with high accuracy and efficiency. This effort combines SSL's expertise in high-speed electronics and pixilated readouts with NOVA's experience in MCP based neutron detectors leading to improved neutron diffraction detectors, maintaining US leadership in neutron science.

Company

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

Title

Fast-Track : High-Volume, Low-Cost Production of Large Area Neutron Science Detectors

Summary

The objective is to demonstrate the capability to efficiently and effectively produce BCS detectors in high volumes to meet the community's needs for large inelastic instruments with a full scale prototype imaging panel.

Company

Radiation Detection Technologies, Inc.
5015 Lake Elbo Road
Manhattan KS, 66502-1442

Title

Microstructured Semiconductor Neutron Detector Arrays for Neutron Scattering Measurements

Summary

The objective of this project is to design and build a high-efficiency neutron detector array consisting of 3000 pixels, with each pixel being 100 microns wide and 4 cm tall. This will be based on the micro-structured semiconductor neutron detector (MSND) technology.

STTR Project

Company

Adelphi Technology, Inc.
2003 E Bayshore Rd
Redwood City CA, 94063-4121

Title

Superconducting Wollaston Prism for Spin Echo Scattering Angle Measurement

Summary

The objective is to increases the signal available and the range of structure sizes that can be seen using neutrons, enabling the understanding and development of new industrial and biological materials as neutron beams are a powerful materials science probe that provides unique information about the structure of matter.

Topic: 10 - Catalysis

Company

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

Title

Enhanced Monomer (Isosorbide) Synthesis from Biomass (cellulose) Source

Summary

The objective is to develop new technology for the conversion of a plant-derived sugar to a chemical intermediate for the production of pharmaceuticals and plastics, replacing petroleum derived materials. This technology will combine environmentally-safe solvents and a catalyst which is more efficient and safer to handle than currently employed materials.

Company

Exelus, Inc.
110 Dorsa Ave

Livingston NJ, 07039-1037

Title

Safe and Renewable Plasticizers from Cellulose

Summary

The objective is to develop a process to make plasticizers from renewable, non-food biomass. This technology will supply the US chemical industry with renewable feedstocks in place of conventional ones derived from crop-sugar.

Company

Kse, Inc
665 Amherst Road
Sunderland MA, 01375-9420

Title

Improved Method for the Production of Tetrahydrofuran from Biomass

Summary

The objective is to establish the technical and economic feasibility of an innovative catalytic decarbonylation hydrogenation technology using reactive distillation to produce THF from a dilute aqueous solution containing furfural. Development of commercially competitive biomass based technologies will reduce

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Company

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

Title

Nanostructured Catalysts for Alkaline PEM Fuel Cells

Summary

The objective is to develop a nano-structured novel support for alkaline PEM catalyst layers. The support will eliminate the difficulties of the catalyst ionomer interface encountered in making alkaline PEM membrane electrode assemblies. This can greatly increase catalyst utilization and improve alkaline PEM ORR and HOR kinetics.

Topic: 11 - Wide Bandgap Semiconductors for Energy Efficiency and Renewable Energy

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Company

Kyma Technologies, Inc.
8829 Midway West Road
Raleigh NC, 27617-4606

Title

Low Cost High Reproducibility Method for GaN Seed Production

Summary

The objective is to develop a low-cost source of Gallium Nitride wafers. This critical new semiconductor material will enable a vast array of next-generation high-power and high-efficiency electronics using US-based, environmentally friendly manufacturing.

Company

Kyma Technologies, Inc.
8829 Midway West Road
Raleigh NC, 27617-4606

Title

FLAAT Growth Technology for Low Cost Thick High Quality GaN on Thin 8 Sapphir

Summary

The objective is to develop low-cost, low-defect, 8” diameter Gallium Nitride template wafers. This critical new semiconductor material will enable a vast array of next-generation high-power and high-efficiency electronics using US-based, environmentally friendly manufacturing.

STTR Project

Company

Genesic Semiconductor Inc
43670 Trade Center Place
Dulles VA, 20166-2123

Title

1200 V/50 A AlGaN-GaN-Si MOS-HFETs and Schottky Rectifiers

Summary

The objective is to develop novel 1200 Volt Gallium Nitride Power Electronics for dramatically improving the electrification efficiency in electric vehicle technologies in support of DOE’s emphasis on improved vehicle fuel economy.

Company

Structured Materials Industries, Inc.
201 Circle Drive North
Piscataway NJ, 08854-3723

Title

High-Current Low-Cost Efficient Power Transistors for Household Appliances

Summary

The objective is to develop thin-film power transistors based on metal organic chemical vapor deposition (MOCVD) grown ZnO material. The goal is to produce high-current low-cost ZnO devices for household appliance applications at a competitive cost to presently used Si-based electronics at significantly increased efficiency and performance.

Company

Accustrata, Inc.
5000 College Avenue
College Park MD, 20740-3809

Title

Monitoring and Control of Chemical Composition of InGaN Layers During MOCVD

Summary

The objective is to address the problems of reduced manufacturing yield and high manufacturing cost, which are major causes for slower adoption of Solid State Lighting (SSL) in daily life. The proposed work will result in improved quality of the semiconductor epitaxial process - the basic process in manufacturing of LED devices.

Topic: 12 - Advanced Fossil Energy Technology Research

STTR Project

Company

Gate Fuels Inc.
2200 Kraft Drive
Blacksburg VA, 24060-1600

Title

Biological CO2 Fixation for the Production of Formic Acid Powered by Sugars

Summary

To objective is to validate the technological feasibility of enzymatic conversion of 6 CO2 and starch to 12 formic acid by putting 13 enzymes together under modest reaction conditions use a bio-mimetic cofactor

replacing a costly the unstable cofactor NAD. The production of formic acid from high-concentration CO2 released by power stations and renewable sugars would bring numerous benefits including the production of a value-added chemical produced from fossil fuels.

Company

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

Title

Computational Materials Design of Castable SX Ni-based Superalloys for IGT Blade Components

Summary

The objective is to computationally design candidate alloys that can achieve enhanced cast-ability while achieving increased metal temperature capability of 1050-1100 C. The predicted behavior of the designs will be benchmarked against current SX alloys such as CMSX-4 and PWA1484. Concept feasibility will be demonstrated by comparing the casting behavior of commercial alloys against QuesTek's predictions.

Company

Altex Technologies Corporation
244 Sobrante Way
Sunnyvale CA, 94086-4087

Title

Advanced Low Cost and Compact Utility Dry Cooling System

Summary

The objective is to design a highly efficient heat exchanger condenser and test at lab-scale under simulated conditions to demonstrate technical feasibility and then refine the full-scale design and life cycle costs to assess economic feasibility. The commercial opportunity for applying to existing utility installations is large.

Topic: 13 - Advanced Fossil Energy Separation And Analysis Research

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Company

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

Title

Acoustic Sensor System for Offshore GCS MVA

Summary

The objective is to develop an intelligent acoustic sensor network intended to monitor for potential escape of CO2 from offshore Geologic Carbon Sequestration reservoirs. It will verify the success of retaining carbon dioxide within reservoir bounds.

Company

Groundmetrics, Inc.
3895 Clairemont Drive
San Diego CA, 92117-5833

Title

Borehole-Deployed Electric Field Sources and Sensors for Permanent Monitoring of CO2 Sequestration in Deep Reservoirs

Summary

The objective is to perform advanced numerical simulations to compare the new source with the existing BSEM source configuration and one being studied at Lawrence Berkeley National Laboratory and to conduct a verification test of the simplest embodiment of the source at a borehole made available by the Big Sky Carbon Sequestration Partnership.

Company

Uhv Technology, Inc.
450 South Freeway
Fort Worth TX, 76104-3503

Title

A TXRF System for Mercury Emissions Monitoring

Summary

The objective is to further develop the XRF analytical method for Hg CEM by incorporating a TER-XRF method that would allow for a large enhancement to the limit of detection as well as the relative accuracy measurements.

Topic: 14 - High Performance Materials for Nuclear Application

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Company

Physical Optics Coroporation
1845 West 205th Street
Torrance CA, 90501-1510

Title

In-Situ NDE Syst. for Structural Integrity Inspection of Nuclear Graphite Comp.

Summary

The objective is to develop a new non-destructive inspection technology based on three-dimensional Compton scattered X-ray imaging. Due to its stability at high temperatures, graphite will be the major structural component and nuclear moderator in the core of Next Generation Nuclear Plants.

Company

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

Title

Development of an In-Situ Method for Cable Condition Monitoring in Nuclear Power Plants

Summary

The objective is to adapt an in-situ electrical testing technique, known as Frequency Domain Reflectometry (FDR) to evaluate the effectiveness of FDR to identify the aging condition of nuclear power plant cables. The result will be a prototype design of an FDR system, including both hardware and software, to be used in a cable aging management program.

Company

Eic Laboratories, Inc.
111 Downey Street
Norwood MA, 02062-2612

Title

Development of a Fiber Optically Coupled Raman Video Probe for the Non-Destructive Inspection of Concrete in Light Water Reactors

Summary

The objective is to develop a nondestructive assessment tool based on Raman spectroscopy for concrete analysis. The Raman tool will be useful in determining chemical corrosion attacks in concrete structures of light water reactors.

Company

Jentek Sensors, Inc.
110-1 Clematis Avenue
Waltham MA, 02453-7013

Title

In-Sito Monitoring of Concrete Condition using Electric Field Sensors

Summary

The objective is to develop an electric field-based sensor technology to assess degradation of concrete in light water reactors. Early identification of chemical and physical attacks will enable targeted remedial actions to reduce the rate of damage or otherwise restore the condition of concrete in critical structures.

Topic: 15 - Low Cost, Optimized Redox Flow Battery Electrolytes, Novel Solid Ionic Conducting Membranes, and Rechargeable Air-Breathing Cathodes for Batteries for Stationary Storage

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Company

Itn Energy Systems, Inc.
8130 Shaffer Parkway
Littleton CO, 80127-4107

Title

Superior Mg-ion Conducting Membranes Based on Textured MgZr4(PO4)6 (MZP) through Low-Temperature Liquid Phase Sintering Techniques

Summary

The objective is to develop a low-cost, high-performance Magnesium Ion (Mg-ion) conducting membrane to enable the production and commercialization of all solid state Mg-ion batteries (MgIB) that will be less expensive and more efficient than current state-of-the-art (SoA) Lithium-ion (Li-ion) batteries, and safer and more reliable than current MgIB designs.

Topic: 15 - Low Cost, Optimized Redox Flow Battery Electrolytes, Novel Solid Ionic Conducting Membranes, and Rechargeable Air-Breathing Cathodes for Bat

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STTR Project

Company

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

Title

Synthesis of a Potential Fast Ionic Conductor for Mg+ Ions

Summary

The objective is to synthesize a new, stable material that will have high conductivity of magnesium ions. This material will allow for the construction of inexpensive, simple, and safe magnesium-air batteries that will store several times more energy than other batteries.

Company

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

Title

High Efficiency Cathode for Metal Air Batteries

Summary

The objective is to develop a high-porosity, fibrous composite air cathode with a low-cost catalyst and a designed mechanism to manage electrolyte flooding. Aside from energy grid stabilization and consumer electronic device applications, lithium air battery technology is a promising opportunity for electric cars.

Topic: 16 -Technology Transfer Opportunities: Basic Energy Sciences

Company

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

Title

Cost-Effective and Environmentally Friendly Manufacturing of Epoxy Foams

Summary

The objective is to demonstrate that epoxy foams can compete with polyurethane, polyisocyanurate, and extruded polystyrene and overcome many of the performance, environmental, regulatory, and health and safety concerns associated with these other foams.

Topic: 17 -Atmospheric Measurement Technology

Company

Hal Technology, Llc
7970 Cherry Ave, Suite 303
Fontana CA, 92336-4025

Title

Compact, Lightweight Dynamic Saturation Cloud Condensation Nuclei Spectrometer for UAV Missions

Summary

The objective is to develop a working spectrometer prototype to demonstrate high-resolution size, concentration, and size distribution measurements of cloud condensation nuclei. The technology developed under this proposed idea will likely result in various instruments as potential viable commercial products for ultrafine particle detection.

Company

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

Title

Compact Raman Lidar for Aerosol Extinction Profiling from Small UAVs

Summary

The objective is to develop a complete conceptual design for a flight-worthy, compact, eye safe lidar that will enable vertical profiling of aerosol optical extinction and scattering and that will be deployable on a compact unmanned aircraft system like the ScanEagle. The basic sensor platform will be adaptable to applications requiring measurement of aerosols where sensor robustness and size are critical to performance, such as monitoring networks for the boundary layer, as well as hazardous volcanic ash clouds.

Company

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

Title

Low SWAP LIDAR Instrument for Arctic Ice Sheet Mass Balance Monitoring

Summary

The objective is to develop an unmanned aerial vehicle (UAV) compatible laser ranging instrument,

ruggedized for the harsh arctic climate to monitor ice mass and surface characteristics.

Company

Aerodyne Research, Inc.
45 Manning Road
Billerica MA, 01821-1397

Title

Infrared laser direct absorption spectroscopy for carbon isotope measurements from UAVs

Summary

The objective is to develop extremely lightweight infrared laser spectrometers for measurements of isotopologues of CO2 and CH4 to be usable for UAV airborne surveys with high precision and speed for studies of Arctic climate change and the terrestrial carbon cycle. The instrumentation will take advantage of the latest advances in continuous wave mid-infrared lasers.

Company

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

Title

Highly sensitive, low-power, and low-weight gas analyzer for UAVs

Summary

The objective is to develop a light-weight miniaturized sensor that can be used on board unmanned aerial vehicles (UAVs) for measurements of greenhouse gases.

Company

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

Title

Compact QCL spectrometer for carbon isotopologue measurements from Small UAVs

Summary

Predictions of global climate change rely on models incorporating precise knowledge of the sources and sinks of important greenhouse gases such as CO2. The objective is to develop a high sensitivity instrument for monitoring the major stable isotopes of CO2.

Company

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

Title

Diode laser sensor for methane detection on an unmanned aerial vehicle

Summary

The objective is to develop a compact, lightweight diode laser sensor for methane that can be flown on a small unmanned aerial vehicle. This sensor will operate in the 3300 nm region using a high sensitivity optical absorption technique. This technology will be useful for natural gas leak detection, both air and ground based. The aerial platform developed could also be applied for detection of other gases by using a different laser.

Company

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

Title

Isotopic CO2 Instrumentation for UAV Measurements

Summary

The objective is to develop state-of-the-art UAV appropriate technology for rapid and precise measurement of isotopic carbon dioxide.

Company

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

Title

Size-Resolved Chemistry of Newly-Formed Atmospheric Particles

Summary

The objective of is to improve the electrical charging, and hence the efficiency of the mobility size selection and particle collection process. This technique will enable measurement of the chemical composition of newly formed particles. Such data will have important atmospheric implications, and for improving understanding of cloud formation and global climate.

Company

Vista Photonics, Inc.
3 N. Chamisa Dr., Ste 1
Santa Fe NM, 87508-9463

Title

Airborne Sensor for Aerosol Precursors

Summary

The objective is to develop an airborne sensor that can monitor low atmospheric concentrations of the aerosol precursor ammonia. It will help to unravel aerosol formation and their impact on climate.

Topic: 18 -Carbon Cycle Measurements of Processes in the Atmosphere and Biosphere

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Company

Li-cor Biosciences
4647 Superior Street
Lincoln NE, 68504-1357

Title

Low Cost Small Sample Volume High Precision Carbon Dioxide Analyzer

Summary

The objective is to develop high-precision, low-cost sensors for measuring the concentration of carbon dioxide in the atmosphere.

Company

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

Title

Lightweight Integrated Optical Sensor for Atmospheric Measurements on Mobile Platforms

Summary

The objective is to develop a novel sensor platform technology that will enable sensitive detection of materials of interest for national security, environmental monitoring, and industrial manufacturing. Commercialization of this technology will enable cost reduction and improvements in the quality of life of all Americans.

STTR Project

Company

Rhizosystems, Llc
P.O. Box 1098
Idyllwild CA, 92545-1098

Title

EAMR: Enhanced Minirhizotron and Image Analysis System

Summary

The objective is to explore alternative potential filters to vary the light source, including fluorescence capability and an 880nm wavelength that would eliminate algal growth on the tube surface and determine the feasibility of 3-D imaging of soil processes to improve the identification ability from images. This technology can be used by researchers in agriculture, forestry, and wild land management.

Company

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

Title

Optical Tomography for 3D Imaging of Fine Roots

Summary

The objective is to develop an optical tomography instrument using readily available components to provide a significant advance in the development of high resolution instrumentation for 3D imaging of fine root systems where ease of analysis and high throughput are critical. Benefits include the availability of a rugged, low cost, OCT-based instrument for 3D imaging root system architecture to evaluate biological carbon sequestration, as well as characterizing biological response to climate change.

Topic: 19 -Enhanced Availablility of Climate Model Output

Company

Rnet Technologies, Inc.
240 W Elmwood Dr
Dayton OH, 45459-4248

Title

Simplified Access to Massive Climate Modeling Data Sets for End Users

Summary

The objective is to develop tools to that automatically and efficiently subset climate modeling data and export for end-use in an SQL-like language. These tools will support a cloud-based service that gives end-users access to entire climate modeling data sets.

Topic: 20 -Technologies for Subsurface Characterization and Monitoring

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STTR Project

Company

Subsurface Insights, Llc
62 Lebanon Street
Hanover NH, 03755-2510

Title

Multiscale Hydrogeologic-Biogeochemical Process Monitoring and Prediction Framework

Summary

The objective is to develop software that provides stakeholders with actionable information on subsurface processes that are cost effective and provide timely monitoring of contaminated sites.

Company

Transcend Engineering And Technology, Llc
P.O. BOX 222
Gaysville VT, 05746-0222

Title

PRISMS - Profile Resolving In-Situ Soil Moisture Sensor

Summary

The objective is to research a novel sensor to improve the monitoring and understanding of conditions underground that are important to the effective management and cleanup of hazardous waste sites. The sensor has been named PRISMS by its developers, for "Profile Resolving In-situ Soil Moisture Sensor."

Company

Vista Engineering Technologies, Inc
1355 Columbia Park Trail
Richland WA, 99352-4770

Title

A Wireline Cone Penetrometer System for Characterization of Radionuclides including Technetium-99

Summary

The objective is to improve methods to detect radioactive contamination below the ground surface in a manner that is more cost effective than current drilling techniques. The new approach utilizes the Cone Penetrometer Technique to deploy the sensor so that no drilling waste is generated, resulting in less disposal costs as well as less worker exposure to the radioactive material.

Company

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

Title

Development of an Automated System to Measure Chlorinated Volatile Organic Compounds in Groundwater and Soil-Gas: A Tool to Enable Remote Field Monitoring of the Long-Term Migration

Summary

The objective is to develop a field-deployable monitoring system providing cost-effective, rapid determination of volatile organic compounds in the groundwater at federal DOE and DOD sites. The development of the system will lead to significant decreases in the future cost of site remediation.

STTR Project

Company

Eic Laboratories, Inc.
111 Downey Street
Norwood MA, 02062-2612

Title

Development of Spectroelectrochemical Technetium Sensor for Groundwater Monitoring

Summary

The objective is to develop a sensor for technetium, in particular pertechnetate, which can be used for in situ ground water monitoring at nuclear waste storage tank farms. The sensor developed will be sensitive to monitoring technetium concentrations at relevant environmental levels.

Company

Eic Laboratories, Inc.
111 Downey Street
Norwood MA, 02062-2612

Title

Development of a Multipass Raman Cell and Instrument for Vapor Analysis of Subsurface Chemical Contaminants

Summary

The goal of this program is to develop a high intensity Raman gas cell and instrument that can be used for field, in situ detection, and chemical analysis of headspace gases in monitoring wells at environmental contamination sites.

Company

Hj Science & Technology, Inc.
187 Saratoga Avenue
Santa Clara CA, 95050-6657

Title

Portable Microfluidic Platform for Real-Time, High Sensitive Detection and Identification of Trichloroethylene and Other Organochloride Compounds

Summary

New technologies are urgently needed for long-term and continuous monitoring of contaminants in the subsurface environment. The objective is to develop novel technology that provides the required sensitivity and selectivity, thus provides just such a means to accomplish this goal.

Company

Innosense Llc
2531 WEST 237TH STREET
TORRANCE CA, 90505-5245

Title

Multi-Analyte Sensor for Detecting Trace Halogenated Organic Contaminants

Summary

The objective is to develop new sensors for sensitive, accurate, low-cost, and real-time and in-situ detection of organic contaminants in groundwater. The proposed technology will benefit the Nation by characterizing contaminated sites, allowing efficient remediation, site closure, and post-closure maintenance.

Topic: 22 -Radiation Detection

Company

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

Title

Solid Solution Hardening of Strontium Iodide

Summary

The objective is to develop a novel approach to the manufacturing of the scintillator material for detection of X- and g-ray radiation with applications in nuclear science, homeland security inspection, and medicine.

Company

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

Title

Plastic Scintillatos with Gamma-Neutron PSD

Summary

The objective is to investigate a novel detector technology for nuclear non-proliferation. It will also be beneficial for scientific studies as well as commercial applications such as non destructive testing.

Company

Xia, Llc
31057 Genstar Rd
Hayward CA, 94544-7831

Title

High Speed, Multi-Channel, User Programmable Digital Data Acquisition System

Summary

The objective is to develop high speed digital detector readout electronics that will help scientists to customize on-board processing for specific applications. It will improve the data obtained from radiation detectors used in homeland security and other applications requiring precise timing, high throughput, and high resolution.

Topic: 23 -Technology to Facilitate Monitoring for Nuclear Explosions

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Company

Weston Geophysical Corp.
181 Bedford St., Suite 1
Lexington MA, 02420-4430

Title

Advanced Data Processing Software to Improve Local Seismic Monitoring Capabilities

Summary

The objective is to develop and test a software system that could be paired with currently available or newly developed sensor instrumentation to perform accurate and complete characterization of low-magnitude events observed on local networks.

Topic: 24 -Nuclear Forensics

Company

Yewsavin, Inc.
2509 Dallas Creek Court
Fort Collins CO, 80528-8558

Title

Hot Inkjet Printing (HIP) Technology for Nuclear Forensic Sample Labeling

Summary

The objective is to assess a new class of Hot Inkjet Printing (HIP) technology for durable alpha-numeric, barcode, and RFID labeling of nuclear forensic samples in the field.

Topic: 26 -Radiation Detection

Company

Alphacore, Inc.
6700 W Chicago St, Ste 5
Chandler AZ, 85226-3337

Title

Single-Chip Read-Out IC for High-Time-Resolution Megapixel-Class Imaging Systems

Summary

The objective is to design a monolithic multichannel readout integrated circuit that improves the capabilities of existing high-count rate imager systems used in airborne/space borne platforms and in medical imaging.

Company

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

Title

High-Count-Rate, High Resolution Single Photon Detector

Summary

The objective is to develop a low light imaging device that develops scene information by counting and locating the photon events as they strike the detector.

Topic: 27 -Advanced Technologies And Materials For Fusion Energy System

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Company

Plasma Processes Llc.
4914 Moores Mill Road
Huntsville AL, 35811-1558

Title

Reduced Activation Tungsten for Fusion

Summary

The objective is to develop reduced activation tungsten based on isotope tailoring. The cost benefits of the reduced activation tungsten material will also be studied. Aside from nuclear fusion applications, electroformed tungsten will be used for non-eroding nozzles in rocket engines, crucibles for crystal growth, heat pipes, welding electrodes, x-ray targets, warhead penetrators, radiation/temperature shielding applications, and other high temperature furnace components.

STTR Project

Company

Nanohmics Inc.
6201 E Oltorf STE 400
Austin TX, 78741-7509

Title

Laser Cladding Applied to the Construction of PFC's with Integral Tritium Diffusion Barriers

Summary

The objective is to design new Plasma-Facing Component (PFC) materials. The impact of improvements in PFC as well as scaling up manufacturing would be significant in realizing the promise of inexpensive power generation from fusion power plants. Billions of dollars are being spent on fusion power as it promises a clean, safe, and reliable source for providing energy.

Company

Advanced Conductor Technologies Llc
3271 Big Hirn St
Boulder CO, 80301-3246

Title

Demountable Joints for HTS Fusion Cables

Summary

The objective is to develop methods to make demountable high-?temperature superconductors (HTS) cable joints that have the electrical and thermal performance, the mechanical strength, and reliability needed for demountable superconducting fusion magnets.

Company

Ultramet
12173 Montague Street
Pacoima CA, 91331-2210

Title

Ductile Tungsten Alloy using Low-Activation Alloying Elements

Summary

The objective is to develop tungsten alloys that will meet high strength and ductility requirements for reliable operation of plasma-facing components in a fusion reactor. For nuclear fusion to be viable for energy generation, materials must be developed that can withstand the demanding fusion reactor environment.

Topic: 28 -Fusion Science And Technology

Company

Hyperv Technologies Corp.
13935 Willard Road
Chantilly VA, 20151-2936

Title

10MHz, 10k-Pixel Fast Fiber-Coupled Imaging Devices for Plasma Diagnostics

Summary

The objective is to develop a novel digital video camera capable of recording long sets of images at extremely high speeds for diagnostic imaging.

Company

Xantho Technologies, Llc
338 N. Hillside Terrace
Madison WI, 53705-3329

Title

Development Of Ultra-Low Noise, Wide Bandwidth, High Gain Transimpedance Amplifiers For Experimental And Commercial Detection Systems

Summary

The objective is to develop ultra-low noise, wide bandwidth, high gain, trans-impedance amplifiers (TIA). The result technology will enable novel TIA products suitable for communication, science, and service industries within government and private sector markets.

Company

Dymenso, Llc
2901 Washington Street
San Francisco CA, 94115-1741

Title

High Precision Electron Gun Development for Gyrotrons

Summary

The objective is to develop precise gyrotron technology to significantly improve electron gun performance while at the same time reducing assembly costs and time. This technology would have applications in many types of microwave devices, such as THz sources, klystrons, and IOTs and could be utilized on other key device components requiring precision assembly, such as circuits and transmission line components.

Company

Compx
P.O. Box 2672
Del Mar CA, 92014-2672

Title

Four-Dimensional Finite-Orbit-Width Fokker-Planck Code with Sources

Summary

The objective is to remove low collisionality and edge-physics limitations by constructing a new, four-dimensional code that incorporates features of existing CQL3D bounce-averaged code. This goal is achieved by creating an interface between different modules of the two types of kinetic codes: (1) the modules that describe collisions, plasma heating and synthetic diagnostics from the bounce-averaged code, and (2) modules that perform integration of kinetic equations in four dimensions.

Company

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

Title

RF models for plasma-surface interactions

Summary

The objective is to develop efficient computer models for complex processes for the optimization of plasma reactors used in semiconductor manufacturing and of fusion experiments. In both semiconductor manufacturing and fusion energy research the interaction of plasma with metal or dielectric materials affects plasma properties in complex ways.

Company

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

Title

High-Resolution and Frequency, Printed Miniature Magnetic Probes

Summary

The objective is to develop a technique to significantly reduce the cost and development time of producing magnetic field diagnostics by designing probes that can be printed on flexible PCBs thereby allowing for extremely small coils. These flexible printed probes could be used anywhere a time varying magnetic field is measured, including medical devices, geophysical sensors, and aerospace applications.

Topic: 29 -High Energy Density Plasmas And Inertial Fusion Energy

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Company

Polymath Research Inc.
827 Bonde Court
Pleasanton CA, 04566-7505

Title

Generation, Detection, and Control of Ultrafast Nonlinear Optical Processes in High Energy Density Plasmas Using Spike Trains of Uneven Duration and Delay

Summary

The objective is to develop and test new design tools for novel ultrafast diagnostics that use nonlinear

optical techniques to ferret out the complex, nonlinear, kinetic, microscopic dynamics of high energy density plasmas. Measuring the slope of the velocity distribution function of a plasma electron or ion species in a velocity sector of interest is one such paramount goal.

Topic: 30 -Low Temperature Plasmas

STTR Project

Company

Seaforth, Llc
Campus Delivery - 1320
Fort Collins CO, 80523-1320

Title

Cavity Enhanced Thomson Scattering System for Low Temperature Plasmas

Summary

The objective is to develop a novel laser Thomson scattering (LTS) system for measurement of weakly-ionized low temperature plasmas. The brighter light source will provide elevated counts of scattered photons and improved sensitivity.

Topic: 30 -Low Temperature Plasmas

Company

Spectral Energies, Llc
5100 Springfield Street
Dayton OH, 45431-1262

Title

Development of truly noninvasive ultrafast imaging diagnostics and advanced plasma flow solver for fundamental studies of low-temperature, non-equilibrium plasmas

Summary

The objective is to develop a unique integrated diagnostic–computational framework that enables an array of new marketable products and technologies for fundamental and applied studies of low-temperature plasmas. Low-temperature plasma technology is a multi-trillion-dollar business, with applications ranging from semiconductor manufacturing, lighting, displays, material science, propulsion, biotechnology, and medicine.

Topic: 31 -High Energy Physics Computational Technology

Company

Real-time Innovations, Inc.
232 East Java Drive
Sunnyvale CA, 94089-1318

Title

A Scalable High Performance Data Distribution Middleware for High Energy Physics Applications

Summary

The objective is to develop an approach based on Data Distribution Service for scalable and extremely high-throughput messaging for High-Energy Physics applications.

Company

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

Title

GPU Enhancements to the Vorpal Plasma Acceleration Module For Modeling Laser-Solid Interactions

Summary

The objective is to develop and implement new capabilities into the commercial software package Vorpal that will make mirror simulations possible. Laser-plasma acceleration is one of the most promising concepts for compact production of high-energy beams, and plasma mirrors are needed to reflect the intense laser pulses into the plasma.

Topic: 32 -Advance Concepts and Technology for High Intensity Accelerators

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Company

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

Title

Energetic Condensation Coating of NbTiN Thin Films for SRF Accelerator Applications

Summary

The objective is to use existing cathodic arc deposition hardware to provide materials cost reductions to the SRF accelerator community. Coated conductor technology has long been the next step in accelerator technology and the most likely way to move from bulk Nb to high transition temperature superconductors.

STTR Project

Company

Nano Materials Innovation Center, Llc
200 N. Main St.
Alfred NY, 14802-1000

Title

Novel Materials for Higher Order Mode Suppressors

Summary

The objective is to create new materials to improve capabilities in our nation's premier particle accelerators: enabling emerging science and applied materials development. The team's new materials will also find applications in high-technology electronics manufacturing, such as with microwaves, radars, and X-rays.

Company

Phoenix Nuclear Labs, Llc
2555 Industrial Drive
Monona WI, 53713-4810

Title

High Reliability, Long Lifetime H- Ion Source

Summary

The objective is to use a modified 2.45 GHz microwave proton source as a source of hydrogen atom beams that will be surface converted to H- ions. The anticipated result will be an extremely reliable DC H- ion source capable of producing high beam currents (greater than 10 mA), which will enable a wide range of government and commercial applications including isotope production and separation, silicon cleaving for semiconductor applications, cyclotron injectors, and ion injectors for magnetic confinement fusion energy.

Topic: 33 -Advanced Concepts And Technology For High Energy Accelerators

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Company

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

Title

(33a)Development of Non-Linear Inserts for IOTA Ring at Fermilab

Summary

The objective is to develop a novel, high-intensity proton accelerator that can be used for a wide variety of research and industrial applications. The accelerator could be used for the next phase of high energy

physics experiments in the intensity frontier at Fermilab and other laboratories.

Company

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

Title

Plasma Photocathode Beam Brightness Transformer for Laser-Plasma Accelerators

Summary

The objective is to develop an ultra short electron beam with unprecedented beam quality that will be used as a driver for the production of mono-energetic x-rays. Such a device will find numerous applications in the areas of medical imaging, active interrogation, industry, and basic research.

Company

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

Title

Dipole Magnet with Elliptical and Rectangular Shielding for a Muon Collider

Summary

The objective is to further ring-dipole magnet technology for a muon-collider or neutrino-factory front end. Commercial applications include magnetic confinement of fusion-energy plasmas, superconducting magnetic energy storage (SMES) and, perhaps, muon radiography for medical and Homeland Security applications.

Company

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

Title

Tailored Density Rectangular Cluster Jets for Laser Plasma Accelerators

Summary

The objective is to develop a key component of a laser plasma particle accelerator. Such accelerators have the potential to reduce the cost and size of particle accelerators for medicine, industry, and science.

STTR Project

Company

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

Title

Robust RF Photocathodes

Summary

The objective is to develop a new generation of photocathodes that provide high performance and long life. Photocathodes are a key component in many accelerator and light source systems. Current lifetimes and performance limit applications to research purposes; however, extending the lifetime and robustness will allow development of systems for industrial, defense, scientific, and medical applications.

Company

Advanced Energy Systems, Inc.
27 Industrial Blvd.
Medford NY, 11763-2286

Title

Developing Rugged, High Quantum Efficiency, Graphene Photocathodes

Summary

The objective is to develop a photocathode based on graphene. These photocathodes could help fill a significant science and technology gap that hinders the use of photoinjectors in large commercial markets.

Topic: 34 -Radio Frequency Accelerator Technology For High Energy Accelerators And Colliders

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Company

Bailey Tool & Mfg. Co.
600 W. Belt Line Road
Lancaster TX, 75146-3019

Title

Seamless SRF Cavity Fabrication by Spin-Necking and Hydroforming

Summary

The objective is to verify methods development through numerical analysis of spin-necking and hydro-forming and then operate a spin-necking process to produce a spin-necked tube, ready for the subsequent

hydro-form process.

Company

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

Title

50 MW S-Band PPM Klystron

Summary

The objective is to develop a high power, high efficiency pulsed S-Band klystron for near term and future DOE high energy linacs.

Company

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

Title

High Power High Frequency RF Generation

Summary

The objective is to develop and fabricate a 11.7 GHz metallic RF power extractor and design a 91 GHz (corrugated waveguide or dielectric based) power extractor. Phase I will culminate in low power tests of the X-band wakefield power extractor and the full engineering design of the W-band structure.

Company

Omega-p, Inc.
291 Whitney Avenue
New Haven CT, 06511-3765

Title

Electron-beam Switches for a High Peak Power Active SLED-II Pulse Compressor

Summary

The objective is to develop and demonstrate high-power X- band switches to operate with the two resonant delay lines of the SLED-II pulse compression system with the goal to extend these preliminary results and to install on the SLAC SLED-II delay lines two switches capable of producing 100ns flat-top pulses with peak power gains of 20:1.

Company

Sigma Technologies International Inc
10960 N Stallard Place
Tucson AZ, 85737-9527

Title

HV Storage Capacitors for High Current Pulse Power Applications

Summary

The objective is to develop solid-state Polymer-Multi- Layer (PML) capacitors for use in high dV/dt pulse power applications. PML capacitors comprise thin, high temperature polymer dielectrics with breakdown strength greater than 1000V/μm.

Topic: 35 -Field Superconductor and Superconducting Magnet Technologies for High Energy Particle Colliders

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Company

Advanced Conductor Technologies Llc
3271 Big Hirn St
Boulder CO, 80301-3246

Title

REBCO Coated Conductor Cables for Accelerator Magnets

Summary

The objective is to develop high-?temperature superconductors (HTS) cables that have a high current density needed for the next generation of superconducting accelerator magnets that operate at fields of 20 T and above. High-?temperature superconducting magnet cables with high current densities will enable the next generation of accelerator magnets for high-?energy physics, proton cancer treatment facilities, and practical fusion magnets.

Company

Supramagnetics, Inc.
214 Canal Street
Plantsville CT, 06479-1742

Title

A New Nb3Sn Process with a Novel Artificial Pinning Center for High Energy Physics and High Magnetic Field Applications

Summary

The objective is to develop an economical Nb3Sn superconductor with advanced performance for High Energy Physics magnets, MRI, and NMR instruments for the general benefit of the public.

Company

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

Title

Next Generation Superconducting Strands for Current Distribution Systems

Summary

The objective is to develop high performance, low cost superconducting material usable in links and current distribution systems for High Energy Physics applications.

Company

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

Title

Inductively Coupled Pulsed Energy Extraction System for 2G Wire-based Magnets

Summary

The objective is to develop a nearly instantaneous protection system for High Temperature Superconductors that could prevent catastrophic coil damage. High Temperature Superconductors are susceptible to different failures than Low Temperature Superconductors.

Company

Ngimat Llc
2436 Over Drive Suite B
Lexington KY, 40511-2637

Title

Fast-Track : Scalable Production of High-Quality Bi2212 Precursor Powder

Summary

The objective is to develop an optimized powder that will power the magnets in high-energy physics colliders, possible DoD uses, and commercial medical imaging devices. The DOE along with researchers in industry and academia has identified an urgent need for superconductor precursor powder used in high-field magnets.

Topic: 36 -High-Speed Electronic Instrumentation for Data Acquisition and Processing

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Company

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

Title

HIGH-SPEED ELECTRONIC INSTRUMENTATION FOR DATA ACQUISITION AND PROCESSING: Radiation-Hard Optical Modulators for High-Energy Physics

Summary

The objective is to develop 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.

Topic: 37 -High-Energy Physics Detectors and Instrumentation

Company

Innosys, Inc.
2900 South Main Street
Salt Lake City UT, 84115-3516

Title

High Energy Physics Detectors and Instrumentation; A High Bandwidth LAPPD Anode

Summary

The objective is to bring advanced RF-engineering tools and techniques to the design of very fast large-area photo-detectors with picosecond-level resolution to provide better resolution in time-of-flight systems at colliders. Specifically, a unique electromagnetic simulation code will be utilized to develop a design that is capable of an analog bandwidth of close to 6 GHz while maintaining the large area of the photo-detector.

Company

Lightspin Technologies, Inc.
P.O. Box 30198
Chevy Chase MD, 20824-0198

Title

Radiation Hard GaInP Photomultiplier Chip(TM)

Summary

The objective is to develop sensors capable of withstanding bombardment by the Large Hadron Collider at CERN. I t will help physicists probe the composition of matter, doctors' ability to peer into the body to find early cancer, and security experts find illicit radioactive materials. This is a critical technology that is currently dominated by Japanese and European manufacturers, though LightSpin's technology is decisively better.

Company

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

Title

Theory-Based High-QE Photocathode Development

Summary

The objective is to develop a non-vacuum transfer method to consistently manufacture photocathodes with high sensitivity will substantially lower the cost per detected photon and enable the development of efficient and affordable detectors for medical, industrial, scientific, and security use.

Company

Allcomp Corporation
209 Puente Avenue
City of Industry CA, 91746-2304

Title

Ultra-Lightweight Carbon Foam for Future Collider Tracking Detectors

Summary

The objective is to develop a new very low mass structural core material for science-based experiments and battery cathodes and provide high conductivity material for efficient heat transport in renewable energy applications.

Topic: 38 -Technology Transfer Opportunity:Detectors

STTR Project

Company

Incom, Inc.
294 Southbridge Road
Charlton MA, 01507-5238

Title

LAPPD Commercialization – Fully Integrated Sealed Detector Devices

Summary

The objective is to demonstrate the feasibility of commercial production of fully integrated hermetically sealed Large Area, 8”X8” Fast Photodetectors for Particle Detection (LAPPD) for HEP Applications. Homeland security (non-proliferation) applications include the ability to screen cargo and vehicles for nuclear materials.

Topic: 39 -Nuclear Physics Software And Data Management

STTR Project

Company

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

Title

PUMA-V: Polyhedral User Mapping Assistant and Visualizer

Summary

The objective is to enable simulations of theories of matter (e.g., interpreting the recent Higgs particle observation) using software produced and maintained at lower costs through automated optimization to power-efficient supercomputers. Commercial applications in several industries include such areas as for energy production challenges, creating and growing new small businesses.

Topic: 40 -Nuclear Physics Electronics Design And Fabrication

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Company

Skutek Instrumentation
410 Linden Street
Rochester NY, 14620-2442

Title

NP-DASIC: Low Cost Digital Firmware ASIC Implementation for Nuclear Physics

Summary

The objective is to develop cost effective digital DAQ electronics providing dozens of channels of waveform digitization, on-board FPGA, Ethernet, USB-2, and VME interfaces, and on-board processor running Linux. Future applications will include nuclear physics, high energy physics, nuclear astrophysics, homeland

security, and education. Public will benefit through electronics that will be more flexible and cheaper than current electronics.

Company

American Semiconductor, Inc.
3100 S Vista Ave Ste 230
Boise ID, 83705-7368

Title

FleX-3D Wafer Processing for Chip Stacking and Interconnect

Summary

The objective is to demonstrate 3D chip stacking including manufacture of the through-silicon vias (TSV) and to demonstrate feasibility for deep sub-micron TSVs. The FleX 3D chip stacking process is applicable to numerous commercial applications including 3D integration of high performance logic with high density memory.

Topic: 41 -Nuclear Physics Accelerator Technology

Company

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

Title

Development of a Superconducting RF Harmonic Cavity for eRHIC

Summary

This objective is to design new cavities for a special linearizing accelerator to preserve the electron beam polarization up to the collision point.

Company

Ultramet
12173 Montague Street
Pacoima CA, 91331-2210

Title

Barrier Coating Development for Manufacture of Superconducting Radio Frequency Accelerator Cavities

Summary

The objective is to investigate economical mandrel barrier coating techniques that will enable significant

cost reductions in the chemical vapor deposition cavity fabrication process. Advanced chemical vapor deposition processing for the fabrication of seamless high-purity niobium superconducting accelerator cavities and ancillary components utilizes a barrier coating-on-mandrel fabrication methodology.

Company

Beam Power Technology, Inc.
142 North Road, Suite F-130
Sudbury MA, 01776-1142

Title

1 MW CW 704 MHz Elliptic Beam Inductive Output Tube (EBIOT)

Summary

The objective is to develop megawatt-class high-power, high-efficiency elliptic-beam inductive output tubes (EBIOTs) for accelerator applications. IOTs are used in areas such as leading edge scientific research and digital TV broadcasting where high power Rf amplification is required.

STTR Project

Company

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

Title

High MTBF RF Source Based upon the Injection Locked Magnetron

Summary

The objective is to design a highly-efficient RF source composed of combined injection locked magnetrons as a drop in replacement for JLAB klystron sources.

Company

Poole Ventura, Inc.
P.O. Box 5023
Oxnard CA, 93031-5023

Title

Apparatus and Technique for Measuring Low RF Resistivity of Tube Coatings at Cryogenic Temperatures

Summary

The objective is to develop a device to measure electrical resistivity of coating at cryogenic temperatures.

Enable optimization of plasma deposition techniques for coating the inside of long, small diameter tubes.

Company

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

Title

Improved Computational Modeling of Electron Cooling in the Medium Energy Regime

Summary

The objective is to develop novel computational capabilities to assist Department of Energy scientists in the design of a premier nuclear physics facility for the study of quark and gluon structure of matter. Resulting state-of-the-art software will also be marketed to plasma processing industry, where engineering new processes requires modeling similar microphysics.

Company

Saxet Surface Science
3913 Todd Lane
Austin TX, 78744-1057

Title

PERM-PUMP: A Power-Free Hydrogen-Extraction Permeation Pump for XHV

Summary

The objective is to develop a vacuum pump that allows routine achievement of better vacuum to protect these electron sources from ion damage. Many of the next generation of physics accelerators will require high average electron currents, a potential issue for electron sources.

Company

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

Title

GaAsSb/AlGaAsP Superlattice Polarized Electron Source

Summary

The objective is to create a new, highly efficient source of polarized electrons for use in high energy particle physics research.

Company

Electrodynamioc
4909 Paseo Del Norte D
Albuquerque NM, 87113--152

Title

Non-Invasive Bunch Length Monitor

Summary

The objective is to develop this concept into an economical beam-monitoring product to provide to the accelerator community that increases the detection resolution, hardware and software development, and side by side comparison with well accepted but invasive deflecting cavity technology.

Topic: 42 -Nuclear Physics Instrumentation, Detection Systems And Techniques

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STTR Project

Company

Adelphi Technology, Inc.
2003 E Bayshore Rd
Redwood City CA, 94063-4121

Title

Efficient, high resolution, position sensitive liquid argon detectors

Summary

The objective is to develop a position sensitive liquid argon detector for nuclear physics experiments, and later for medical imaging. Liquid argon detectors are a low cost technology for the highly sensitive detection of weak signals.

Company

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

Title

Modular Planar Germanium Detector Systems for High Resolution Gamma-ray Spectroscopy and Tracking Arrays

Summary

The objective is to develop new high-resolution radiation detection systems that combine modular designs

with advanced Nuclear-Physics array concepts to provide a greater understanding of fundamental Nuclear Structure while creating new imaging technology for applied fields such as Nuclear-Medicine imaging.

Company

Xia, Llc
31057 Genstar Rd
Hayward CA, 94544-7831

Title

Proximity charge sensing readout in HPGe detectors

Summary

The objective is to demonstrate the performance potential of a novel radiation sensing scheme that will significantly advance the state-of-the-art for three-dimensional position-sensitive and high-resolution detectors used in imaging or radiation tracking applications. Position-sensing detectors for nuclear radiation imaging and tracking purposes have numerous physics and homeland security applications.

Company

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

Title

Digital Silicon Photomultiplier Readout Circuit

Summary

The objective is to develop a digital readout for single photon sensitive arrays using domestic, low cost CMOS foundries. The readout circuit will enable a new class of detector for science, medical, and homeland security applications.

Company

Microxact Incorporated
295 Industrial Drive
Christiansburg VA, 24073-2538

Title

Radiation resistant magnetic field sensor

Summary

The objective is to develop the precise, radiation resistant magnetic field sensor. The proposed sensors are expected to function for years without the need for replacement or recalibration, thus saving US taxpayers many millions annually currently spent on magnetic field sensor replacements at US accelerator and

tokomak facilities.

Topic: 43 -Nuclear Physics Isotope Science and Technology

Company

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

Title

Staged, rotating plasma, stable isotope separator

Summary

The objective is to demonstrate a cost effective method to increase isotope enrichment for medicine and research using existing plasma centrifuge technology.