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Surface Wave Dispersion Measurements and Tomography from Ambient Seismic Noise

30-Sep-2008 12 pages

Correlation in China

Authors: [Xiaodong Song](#); [Xinlei Sun](#); [Sihua Zheng](#); [Zhen Xu](#); [Yingjie Yang](#); [Michael H Ritzwoller](#); [ILLINOIS UNIV AT URBANA-CHAMAPIGN](#)

Full Text

We perform ambient noise tomography of China using the data from the China National Seismic Network and global and PASSCAL stations. The results so far are summarized below. (1) Dispersion measurements and tomography. For most of the station pairs, we retrieve good Rayleigh waveforms from ambient noise correlations using 18 months of continuous data at all distance ranges across the entire region (over 5000 km) and for periods from 70 ...

Increasing Combat Aircraft Survivability Through Coherent Self-Protection Jammers

01-Mar-2008 90 pages

Authors: [Soner Oezer](#); [AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF ENGINEERING AND MANAGEMENT](#)

Full Text

When the battlefields were within the visual range, the objective of deception tactics in warfare was to deceive the human senses. In the battlefield of electromagnetic spectrum, the objective of deception is to deceive the sensors of the enemy weapon systems. The survivability of the aircraft operating in hostile environment is of prime importance to the mission planner. If the aircraft can deny its location information to the tracking radar ...

Identification and Development of a Gelled Fuel through the Use of Liquid Gelling Agents

01-Feb-2008 48 pages

Authors: [Claire Wells](#); [James R Lee](#); [Christopher Hooban](#); [Wynn Vo](#); [NAVAL SURFACE WARFARE CENTER DAHLGREN DIV VA](#)

Full Text

The United States Forestry Service (USFS) currently uses solid powder gelling agents to create gelled gasoline for controlled burns. Because these gelling agents are difficult to mix with gasoline, nonhomogeneous solutions result. The inconsistency in the gelled gasoline results in larger quantities of it being used for controlled burns and also worsens the safety hazards associated with gel dispersion. Therefore, the project objective was to solve these problems by producing ...

Preparation, Electromechanical, and Structural Study of Carbon Nanotube/Gelatin

15 JAN 2008 32 pages

Nanocomposites

Authors: [Soo-Young Park](#); [KYUNGPOOK NATIONAL UNIV DAEGU \(REPUBLIC OF KOREA\)](#)

Full Text

Multi-walled carbon nanotube "MWNT"/gelatin composites by dispersion of MWNT through ultrasonication in an aqueous medium with anionic surfactant sodium dodecyl sulfate "SDS". The swelling behavior and the bending mechanism of the composite and pure gelatin films were studied in order to clarify the potential use of MWNT in the gelatin actuator. The response of the composite and pure hydrogel to the applied electrical field in the NaCl aqueous solution was ...

Hot Diffusion - Tactical Information Management Substrate

JAN 2008 56 pages

Authors: [Matt Stillerman](#); [ODYSSEY RESEARCH ASSOCIATES INC ITHACA NY](#)

Full Text

To summarize our results, ATC-NY developed a new suite of algorithms for information dispersion in HotDiffusion. Our testing indicates that, in comparison with more conventional approaches, HotDiffusion should excel under very sparse network conditions, especially if there is enough dynamism in connectivity. We expect its performance to degrade gracefully as conditions worsen. We measured performance using a full implementation of HotDiffusion, as well as simulation. The implementation runs on a ...

Durable Hybrid Coatings

OCT 2007 134 pages

Authors: [Bret J. Chisholm](#); [Douglas L. Schulz](#); [Gregory J. McCarthy](#); [Dante Battocchi](#); [Gordon P. Bierwagen](#); [NORTH DAKOTA STATE UNIV FARGO](#)

Full Text

The goal of this program is to contribute to the development of the next-generation anti-corrosion and other protective coating systems for USAF aircraft. The initial emphasis of the program was on improvements in NDSU's promising Mg-based primer, which NDSU recently licensed to the major international aircraft coatings manufacturer. Work continued over the last year on improvements in primer binder, additions to NDSU's world-class high-throughput (HT) research and development capabilities that ...

[Measurement of Chromatic Dispersion using the Baseband Radio-Frequency Response of a Phase-Modulated Analog Optical Link Employing a Reference Fiber](#) 19 SEP 2007 20 pages

Authors: [Jason D. McKinney](#); [John Diehl](#); [NAVAL RESEARCH LAB WASHINGTON DC](#)

Full Text

In this work we demonstrate a new technique for measuring the chromatic dispersion of an optical fiber using the baseband RF response of a phase-modulated analog optical link in concert with a well-characterized fiber that serves as a dispersion reference. We show that optical phase modulation provides increased measurement resolution and immunity to optical modulator bias-drift as compared to baseband methods utilizing optical intensity modulation. In addition, we provide a ...

[PAR3D: Numerical Model for Incompressible Flow with Application to Aerosol Dispersion in Complex Enclosures](#) SEP 2007 80 pages

Authors: [Robert S. Bernard](#); [Phu V. Luong](#); [Mario J. Sanchez](#); [ENGINEER RESEARCH AND DEVELOPMENT CENTER VICKSBURG MS COASTAL AND HYDRAULICS LAB](#)

Full Text

Abstract: This report documents the development of the PAR3D numerical flow model, with emphasis on modifications incorporated to facilitate simulations of contaminant dispersion in complex buildings and other enclosures. PAR3D is a general-purpose computational fluid dynamics (CFD) code for predicting three-dimensional flow and transport in air, water, and other incompressible fluids. It includes a two-equation turbulence model with adjustments for buoyancy, as well as transport equations for suspended materials (contaminants), ...

[Implementation of the Quantified Judgement Model to Examine the Impact of Human Factors on Marine Corps Distributed Operations](#) SEP 2007 59 pages

Authors: [Matthew S. Desmond](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA](#)

Full Text

The Distributed Operations (DO) concept is designed to answer the challenge of covert, highly adaptable, enemies operating with a dispersed command structure. The human variance that is part of military combat presents a critical challenge to the United States Marine Corps in the implementation of the DO concept. In addition to all current capabilities a DO Marine unit would have the additional capability of operating in smaller, more autonomous units, ...

[Directed Assembly of Quantum Dots in Diblock Copolymer Matrix](#) AUG 2007 20 pages

Authors: [Frederick L. Beyer](#); [Christopher R. Ziegler](#); [Kevin Sill](#); [Todd Emrick](#); [Nicholas M. Benetatos](#); [Karen I. Winey](#); [ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE](#)

Full Text

The effect of ligand molecular weight on nanoparticle dispersion and nanocomposite morphology has been investigated. Nanoscopic particles, CdSe/ZnS quantum dots (QDs), were dispersed into the polystyrene (PS) microdomains of a microphase separated, bulk PS-poly(methyl methacrylate) block copolymer. The QDs were compatibilized with the PS-domains of the microphase separated block copolymer by the use of PS-based ligands associated with the surfaces of the QDs. A stock solution of the functionalized particles ...

[Concentrating on Dispersed Operations: Answering the Emerging Antiaccess Challenge in the Pacific Rim](#) 01-Apr-2007 90 pages

Authors: [William E Pinter](#); [AIR UNIV MAXWELL AFB AL SCHOOL OF ADVANCED AIR AND SPACE STUDIES](#)

Full Text

Potential adversaries of the United States recognize that its ability to globally project combat power is essential to maintaining military dominance. Degrading US combat power projection requires a strategy of access denial which consists of geopolitical and military measures. In the Pacific Rim, the development of antiaccess capabilities is accelerating. Specifically, China has increased its procurement of ballistic, cruise, and anti-ship missiles, sea mines, and diesel submarines with a special ...

[Initial Results From the USNO Dispersed Fourier Transform Spectrograph](#) 25 JAN 2007 19 pages

Authors: [Arsen R. Hajian](#); [Bradford B. Behr](#); [Andrew T. Cenko](#); [Robert P. Olling](#); [David Mozurkewich](#); [J. T. Armstrong](#); [Brian Poh](#); [Sevan Petrossian](#); [Kevin H. Knuth](#); [Robert B. Hindsley](#); [NAVAL OBSERVATORY WASHINGTON DC](#)

Full Text

We have designed and constructed a dispersed Fourier transform spectrometer (dFTS), consisting of a conventional FTS followed by a grating spectrometer. By combining these two devices, we negate a substantial fraction of the sensitivity disadvantage of a conventional FTS for high-resolution, broadband, optical spectroscopy, while preserving many of the advantages inherent to interferometric spectrometers. In addition, we have implemented a simple and inexpensive laser metrology system, which enables very precise calibration ...

[Strong Optical Injection Locking of Edge-Emitting Lasers and Its Applications](#) 18 AUG 2006 158 pages

Authors: [Hyuk-Kee Sung](#); [CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE](#)

Full Text

Semiconductor lasers are essential components that enable high-speed long-haul communication and have been widely used for various applications in photonics technology. Semiconductor lasers under optical injection locking exhibit superior performance over free-running lasers and provide useful applications not achievable through the free-running lasers. The performance of injection-locked lasers has been found to be significantly improved with stronger injection. In this dissertation, the characteristics and applications of semiconductor lasers under strong ...

[Functionalization of Carbon Nanotubes via Electrophilic Substitution Reaction in Polyphosphoric Acid](#) 26 JUL 2006 33 pages

Authors: [Jong-Beom Baek](#); [CHUNGBUK NATIONAL UNIV \(KOREA\) SCHOOL OF CHEMICAL ENGINEERING](#)

Polyphosphoric acid (PPA) with optimized P2O5 content as an electrophilic-substitution-reaction medium is indeed benign and effective for the covalent attachment of polyetherketones onto the surface of the electron-deficient MWNT and VGCNF. Furthermore, on the basis of all supportive evidences, this work provides one of the most

Full Text efficient methods to directly and uniformly grafting the surfaces of carbon nanotubes (CNT) and nanofibers (CNF) without or minimum damages. More importantly, the fact ...

Advanced Soft Tissue for Telemedicine and Surgical Simulation

JUL 2006 10 pages

Authors: [Ivan Vesely](#); [CLEVELAND CLINIC FOUNDATION OH](#)

Full Text

The objectives of this project were to develop computer based models of soft tissues that could eventually be integrated into virtual reality-based surgical simulators. To that end, we have developed a number of computer algorithms that span the scales from the microstructural to the phenomenological, and from 1-D to 3-D. For the 1-D case, we have developed a model of fractional order viscoelasticity. For the 3-D case, we have developed ...

Combustion Synthesis Technology Applied to In-situ Resource Utilization

15 JUN 2006 15 pages

Authors: [Osamu Odawara](#); [TOKYO INST OF TECH YOKOHAMA \(JAPAN\) INTERDISCIPLINARY GRADUATE SCHOOL OF SCIENCE AND ENGINEERING](#)

Full Text

Solution combustion synthesis is different from solid and gas combustion in the presence of water. Fuels form natural resources were applied to the solution combustion of "SrAl₂O₄: Eu, Dy" compounds and properties of the products were studied. Technology to develop non-aggregating particles can be established with uniformly dispersed compounds.

An Integrated Approach to Evaluating the Environmental Impact Following a Radiological Dispersal Event

JUN 2006 200 pages

Authors: [David A. Smith](#); [OHIO STATE UNIV COLUMBUS](#)

Full Text

Actions taken immediately after a terrorism act involving radioactive materials are critical for human health and safety and environmental protection. The appropriate actions are based on an assessment of the impact the release of radioactive material had or could have on the affected region. Typical risk assessment methods are either ecological or human health based. There have been calls to integrate the two approaches but, as of yet, no integrated ...

High Order Hybrid Central - WENO Finite Difference Scheme for Conservation Laws

30-Jan-2006 15 pages

Authors: [Bruno Costa](#); [Wai S Don](#); [BROWN UNIV PROVIDENCE RI DIV OF APPLIED MATHEMATICS](#)

Full Text

In this article we present a high resolution hybrid central finite difference-WENO scheme for the solution of conservation laws, in particular, those related to shock turbulence interaction problems. A sixth order central finite difference scheme is conjugated with a fifth order weighted essentially non-oscillatory WENO scheme in a grid-based adaptive way. High Order Multi-Resolution analysis is used to detect the high gradients regions of the numerical solution in order to ...

Finite Element-Based Coastal Ocean Modeling: Today and Tomorrow

2006 4 pages

Authors: [C. A. Blain](#); [T. C. Massey](#); [R. A. Arnone](#); [R. W. Gould](#); [NAVAL RESEARCH LAB STENNIS SPACE CENTER MS OCEANOGRAPHY DIV](#)

Full Text

The continued necessity of military special forces operations in riverine and coastal environments along with increasing civilian concerns related to sediment transport, search and rescue, pollutant dispersal, and coastal restoration, have resulted in the need for detailed knowledge of currents and water levels in coastal, estuarine, and riverine environments. This demand for information at highly resolved spatial and temporal scales and the availability of massively parallel computer resources has brought ...

Bomb Strike Experiment for Mine Countermeasure

2006 19 pages

Authors: [Peter C. Chu](#); [Greg Ray](#); [Peter Fleischer](#); [Paul Gefken](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA NAVAL OCEAN ANALYSIS AND PREDICTION LAB](#)

Full Text

The Navy's bomb maneuvering model (STRIKE35) predicts the bomb location and trajectory in air and water columns. The Bomb Strike Experiment for Mine Countermeasure Operations, currently sponsored through the Office of Naval Research mine and obstacle breaching technology program, is part of a multi-year, comprehensive effort aimed at enhancing the Navy's fleet naval mine clearance capability and success. The investigation discussed in this thesis examines the experimental and theoretical characteristics ...

Evidence for an Infrasound Waveguide

NOV 2005 8 pages

Authors: [Eugene Herrin](#); [Tae Sung Kim](#); [Brian Stump](#); [SOUTHERN METHODIST UNIV DALLAS TX DEPT OF GEOLOGICAL SCIENCES](#)

Full Text

On May 30, 2005, eight strongly dispersed infrasound signals were recorded at one seismo-acoustic array in the Republic of Korea. Phase-matched filtering (Herrin & Goforth, 1977) and a forward modeling technique were used to determine the nature of the dispersion. The most likely explanation for these dispersed infrasound signals is that the dispersion is due to propagation down a low-velocity waveguide: This can be characterized as an ephemeral "SOFAR" layer ...

Investigating Photonic Nanostructures for Reproducible Characterization of Bacterial Spores

01 OCT 2005 12 pages

Authors: [Jay P. Jones](#); [Jr Fell Nicholas F.](#); [Troy Alexander](#); [Christin Tombrello](#); [III Fountain Augustus W.](#); [ARMY RESEARCH LAB ADELPHI MD SENSORS SIGNATURES AND SIGNAL PROCESSING INFORMATION DIRECTORATE](#)

Full Text

Raman spectroscopy has proven to be a plausible solution to the difficult challenge of on-site detection of biological threats. Adding to the challenge is the fact that many biological species, spores specifically, have relatively low scattering cross sections. The intrinsic need to detect these threats at low concentrations and in the presence of strong background signals necessitates the need for surface enhancement schemes. With an available technique to quickly identify ...

[Over-water Simulant Release Testing for the Joint Services Lightweight Standoff Chemical Agent Detector \(JSLSCAD\)](#) 01 OCT 2005 20 pages

Authors: [Daniel Driscoll](#); [Brian Patrick](#); [Gregory Johnson](#); [Katherine Patton-Hall](#); [Gary M. Turman](#); [Mike Cornwell](#); [Brian Stelmok](#); [Rob Kinter](#); [NAVAL SURFACE WARFARE CENTER DAHLGREN DIV VA](#)

Full Text

NSWCDD Has supported the JSLSCAD program through participation in joint IPTs for system development, logistics, and test and evaluation. As part of its role in support of Test and Evaluation NSWC performed over water testing of the JSLSCAD on its Potomac River Test Range in July/August of this year. Testing over water presents several unique challenges, foremost being to question of how to adequately referee the simulants challenge, and how ...

[Methodology Development for Measurement of Agent Fate in an Environmental Wind Tunnel](#) 01 OCT 2005 10 pages

Authors: [Wendel Shuely](#); [Robert Nickol](#); [John Pence](#); [Daniel Weber](#); [John Molnar](#); [Seok Hong](#); [Ken Sumpter](#); [EAI CORP JOPPATOWNE MD](#)

Full Text

The environmental fate of chemical warfare agents on targeted surfaces is important in modeling vapor and contact hazard for decisions influencing safety of personnel in contaminated areas. Several laboratory wind tunnels are under development and include microbalance, vapor sampled, and contact angle wind tunnels. A wide spectrum of methodology development is required to control and measure physical parameters and analyze mass distribution. The methodology developed to date will be described ...

[Fate of Nerve Agent Simulants on Concrete](#) 01 OCT 2005 8 pages

Authors: [C. A. Brevett](#); [G. W. Wagner](#); [GEO-CENTERS INC ABERDEEN PROVING GROUND MD](#)

Full Text

The nerve agent VX (O-ethyl S-[2-(diisopropylamino)ethyl]methylphosphonothiolate) has been shown to decompose in contact with concrete surfaces. We have previously shown that 31P NMR can be employed to study 1) the adsorption of VX into concrete; 2) the decomposition kinetics; and 3) detect decomposition products. Recently reported results show a dramatic effect of the VX decomposition kinetics on droplet size, with 0.01 micro Liter droplets reacting within a few ...

[Time Exposure Acoustics for Imaging Underground Structures](#) 30 SEP 2005 20 pages

Authors: [I. J. Won](#); [GEOPHEX LTD RALEIGH NC](#)

Full Text

The coal mine study demonstrates that passive imaging is feasible under realistic conditions, but improvements are certainly possible. For example, some noticeable phase rotation of the seismic traces across the array is evident when the traces are plotted (e.g., as in Figure ii but at higher magnification). The phase rotation is probably due in part to dispersion of the seismic waves as a function of path length (greater path lengths ...

[Industrial Hazards to Military Personnel](#) 2005 21 pages

Authors: [D. P. Bacon](#); [R. M. Garrett](#); [P. L. Liotta](#); [D. E. Mays](#); [T. E. Miller](#); [ARMED FORCES MEDICAL INTELLIGENCE CENTER FORT DETRICK FEDERICK MD](#)

Full Text

The industrial chemical health threat to the US military is growing. The increasing threat is due both to the more frequent use of industrial chemicals and infrastructure as weapons of war and opportunity, and to recent military operations in urban and industrial environments where accidents or terrorism may cause large-scale chemical releases. Using traditional single-scenario modeling techniques, it is difficult to prospectively portray the complex array of potential chemical hazards ...

[Issues of Compatibility Between Nanomaterials and Aluminum Scanning Electron Microscopic Mounts](#) DEC 2004 18 pages

Authors: [Donovan Harris](#); [ARMY RESEARCH LAB ABERDEEN PROVING GROUND MD WEAPONS AND MATERIALS RESEARCH DIRECTORATE](#)

Full Text

Aluminum mounts are ubiquitously present in scanning electron microscope (SEM) laboratories. They are an inexpensive light material with good conductivity properties, and are generally compatible with conductive adhesive products. In the course of using aluminum mounts to examine nanoscale materials, some compatibility issues were revealed. One limiting issue was charge conduction. Nanoscale materials can be a more efficient conductor of electrons than the aluminum mount with its layer of oxides. ...

[Nanocomposites for Carbon Fiber Reinforced Polymer Matrix Composites](#) 26 OCT 2004 34 pages

Authors: [J. H. Koo](#); [L. A. Pilato](#); [G. Wissler](#); [A. Lee](#); [A. Abusafieh](#); [TEXAS UNIV AT AUSTIN DEPT OF MECHANICAL ENGINEERING](#)

Full Text

The major objective of this material program is to develop an improved epoxy nanocomposite for carbon fiber-reinforced polymer matrix composite (CPMC) with higher temperature performance capability, mechanical performance, damage resistance, extreme environment corrosion resistance, and improved dimensional control. We proposed that a nanophase be introduced into specific components of an epoxy resin system, prior to cure, to provide improved Tg and mechanical strength of the composites. In this study, we ...

[Initial Experiment in Using a Powered Parafoil for Employment of Intelligence, Surveillance, and Reconnaissance \(ISR\) Unattended Ground Sensors \(UGS\)](#) OCT 2004 24 pages

Authors: [Michael A. Kolodny](#); [ARMY RESEARCH LAB ADELPHI MD SENSORS AND ELECTRON DEVICES DIRECTORATE](#)

Full Text

Experiments were run by the U.S. Army Research Laboratory at Yuma Proving Ground, AZ, on 10 and 12 June 2004 to obtain an initial assessment of the viability of using a powered parafoil as an unmanned air vehicle for employment of Future Combat System intelligence, surveillance, and reconnaissance unattended ground sensors

(UGS). These experiments were conducted as an adjunct to the testing of the parafoil for the Special Operations Command ...

[Measuring Rates and Effects of Dredging-Induced Sedimentation: Results From a Survey of Experts](#)

SEP 2004 27 pages

Authors: [J. D. Germano](#); [D. A. Carey](#); [GERMANO AND ASSOCIATES INC BELLEVUE WA](#)

Full Text

Dredging and disposal of dredged material in aquatic environments can expose animals and plants to episodic pulses of suspended sediment. The resuspended material may then be deposited in thin layers adjacent to the dredging or disposal areas in some cases as much as several thousand meters distant. The intensity and duration of resuspension from dredging and disposal operations is highly dependent on the type of equipment, operator, character of sediment, ...

[A New Generation of Magneto-Rheological Fluid Dampers](#)

25 AUG 2004 58 pages

Authors: [F. Gordaninejad](#); [A. Fuchs](#); [U. Dogrouir](#); [S. Karakas](#); [Y. Liu](#); [NEVADA UNIV RENO DEPT OF MECHANICAL ENGINEERING](#)

Full Text

The overall goal of this 3-year project was to study the performance of novel, fail-safe, magneto-rheological fluid (MRF) dampers by using innovative magneto-rheological (MR) materials for off-highway, high-payload vehicles such as the U.S. Army's High Mobility Multi-Purpose Wheeled Vehicle (HMMWV). In the past 3 years, significant advances were achieved in the following areas: (1) MR materials development; (2) theoretical modeling and experimental study of a new compact fail-safe MR damper, ...

[Defects in Ion-Implanted Silicon Carbide](#)

01 JUL 2004 5 pages

Authors: [Mulpuri V. Rao](#); [GEORGE MASON UNIV FAIRFAX VA](#)

Full Text

Defects that introduce electrically active deep levels in ion-implanted Silicon Carbide (SiC) were studied by performing capacitance Deep-Level Transient Spectroscopy (DLTS) and transconductance frequency dispersion measurements on fully implanted MESFETs in bulk semi-insulating 4-H SiC, MISFETs in 6-H SiC and double implanted p-n and n-p junction diodes in 4-H SiC. The junction diodes made with aluminum and phosphorus implantations exhibited higher reverse leakage current compared to those made ...

[Theoretical Analysis of Narrow-Band Surface Wave Magnitudes](#)

30 JUN 2004 42 pages

Authors: [David R. Russell](#); [AIR FORCE TECHNICAL APPLICATIONS CENTER PATRICK AFB FL](#)

Full Text

A major problem with time domain measurements of seismic surface waves is the significant effect of non-dispersed Rayleigh waves (Airy phases) which can occur at both regional and teleseismic distances. This paper derives a time domain method for measuring surface waves with minimum digital processing, using zero-phase Butterworth filters. This method can effectively measure surface wave magnitudes at both regional and teleseismic distances, while ensuring that the magnitudes are ...

[Dirty Bombs: The Technical Aspects of Radiological Dispersion Devices](#)

JUN 2004 100 pages

Authors: [Benjamin F. Visger](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA](#)

Full Text

Considering the ever-rising threat of terrorist attack and disruption of the economy and of daily activity, the potential strength of a radiological dispersion device must be evaluated. A dirty bomb is a weapon in the terrorist arsenal that is highly effective in creating chaos, panic and disruption. All of the immediate deaths caused by a dirty bomb are due to blast effects, however the public association with radiation and nuclear ...

[Dynamic Punch Shear Behavior of Unidirectional and Plain Weave S-2 Glass/SC15 Composites](#)

MAR 2004 36 pages

Authors: [Libo Ren](#); [Bazle A. Gama](#); [John W. Gillespie Jr.](#); [Chian-Fong Yen](#); [DELAWARE UNIV NEWARK CENTER FOR COMPOSITE MATERIALS](#)

Full Text

Dynamic punch shear behavior of unidirectional and plain weave S-2 Glass/SC15 epoxy composites is presented. An incident bar and a transmission tube assembly in compression split-Hopkinson Bar setup is used for the dynamic punch shear study. Dispersion correction methodology is used with "3-wave" analysis to convert the experimental bar data into dynamic load-displacement curves. A methodology for determining the average transverse shear strength of the composite laminates is described. The ...

[Ground-State SiO Maser Emission Toward Evolved Stars](#)

20 FEB 2004 18 pages

Authors: [D. A. Boboltz](#); [M. J. Claussen](#); [NAVAL OBSERVATORY WASHINGTON DC](#)

Full Text

We have made the first unambiguous detection of vibrational ground-state maser emission from ^{28}SiO toward six evolved stars. Using the Very Large Array, we simultaneously observed the $v = 0, J = 1-0$, 43.4-GHz, groundstate and the $v = 1, J = 1-0$, 43.1-GHz, first excited-state transitions of ^{28}SiO toward the oxygen-rich evolved stars IRC+10011, α Ceti, W Hya, RX Boo, NML Cyg, and R Cas and the S-type star chi ...

[Fiber Laser Array](#)

JAN 2004 76 pages

Authors: [Thomas B. Simpson](#); [TITAN CORP SAN DIEGO CA](#)

Full Text

Experiments have been conducted to investigate the feasibility and scalability of coherent laser output from an array of fiber lasers with strong intracavity coupling. A flexible reconfigurable experimental apparatus has been modified and configured for these investigations. Measurements taken with this apparatus during this program showed that without polarization selection, the lasers were likely to exhibit spectra that showed the effects of polarization mode dispersion. Arrays of 2-5 amplifier elements coupling ...

[Multi-Echelon Distributed Army Leaders' Information Support Training \(Medalist\): Prototype Development and Recommendations for Future Research](#)

JAN 2004 70 pages

Authors: [Christopher R. Graves](#); [Charles G. Heiden](#); [Samuel N. Jenkins](#); [Michael R. Flynn](#); [Paul G. Smith](#); [HUMAN RESOURCES RESEARCH ORGANIZATION ALEXANDRIA VA](#)

Full Text

As the U.S. Army approaches the Future Force time frame, challenges include developing leaders who are proficient in the conduct of dispersed operations and delivering effective training when and where training needs arise. This report describes the recently completed Multi-Echelon Distributed Army Leaders' Information Support Training (MEDALIST) project. The project was sponsored by the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) Armored Forces Research Unit and ...

[Adaptive Optoelectronic Eye](#)

23 DEC 2003 53 pages

Authors: [Pallab Bhattacharya](#); [MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE](#)

Full Text

The objective of this multidisciplinary research program was to develop a versatile image sensor technology where advances in optical devices and merging of optoelectronic, micro-optic and micromechanical components would allow the feasibility of tightly coupled adaptive focal plan arrays. We adopted a layered architecture in which the essential elements were: The front-end optics consisting of a variable focus Fresnel lens, a microlens array and a microprism array for color dispersion ...

[Using Rapid Environmental Assessment to Improve the Hazard Prediction and Assessment Capability for Weapons of Mass Destruction](#)

DEC 2003 65 pages

Authors: [Victor B. Ross III](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA DEPT OF METEOROLOGY](#)

Full Text

The Oceanographer of% the Navy is responsible for the environmental data portion of the "4-D cube". This is a new concept that creates a Virtual Natural Environment that must be capable of rapid environmental updates. This research investigates using in situ atmospheric measurements to improve the performance of the Navy mesoscale model, Coupled Ocean-Atmosphere Mesoscale Prediction System. These enhanced, operational model forecasts are used to supply atmospheric forcing to a ...

[Improved Surface Wave Dispersion Models and Amplitude Measurements](#)

24 OCT 2003 37 pages

Authors: [J. L. Stevens](#); [D. A. Adams](#); [M. G. Eneva](#); [G. B. Baker](#); [SCIENCE APPLICATIONS INTERNATIONAL CORP SAN DIEGO CA](#)

Full Text

The report describes the status and results to reduce the magnitude threshold for which surface waves can be identified and measured reliably, and to improve the accuracy of surface wave measurements, using phase-matched filtering, development of global regionalized earth and dispersion models, and other techniques. We have focused on improvements to global earth models and dispersion maps, and improved techniques for measuring surface wave amplitudes. Completed work on implementation and ...

[Adaptive Structure Aware Memory Systems](#)

OCT 2003 43 pages

Authors: [John B. Carter](#); [UTAH UNIV SALT LAKE CITY](#)

Full Text

This report describes the design of the Impulse architecture and shows how an Impulse memory system can be used in a variety of ways to improve the performance of data-intensive applications. The Impulse design does not require any modification to processor, cache, or bus designs - all novel hardware functionality resides at the memory controller. As a result, Impulse optimizations can be adopted in conventional systems without major system changes. ...

[Dispersion Effects in Nonlinear Light Propagation in 1-D Fiber Gratings](#)

12 SEP 2003 81 pages

Authors: [Carlos Martel](#); [UNIVERSIDAD POLITECNICA DE MADRID \(SPAIN\)](#)

Full Text

This report results from a contract tasking Universidad Politecnica de Madrid as follows: The contractor will investigate the use of the so-called nonlinear coupled mode equations (NLCME) to obtain approximate solutions of Maxwell's equations for light propagation in periodic optical fiber structures. In particular, one class of solutions called "Gap Solitons." exhibit the ability to propagate at any speed from zero to the local speed of light, and offer great ...

[Grain Size Control in AA5083 by Thermomechanical Processing \(TMP\): The Role of Dispersed Particles](#)

SEP 2003 109 pages

Authors: [Ramiro E. Orellano Jr](#); [NAVAL POSTGRADUATE SCHOOL MONTEREY CA DEPT OF MECHANICAL AND ASTRONAUTICAL ENGINEERING](#)

Full Text

Superplasticity in Aluminum alloys allows for the economical forming of components of complex shapes while retaining the high-strength and stiffness- to-weight ratios characteristic of alloys used in automotive, aerospace and military applications. Superplastic materials require fine grains with high- angle boundaries having resistance to failure by cavitation. This study was designed to achieve improved control of microstructure of Continuously Cast (CC) AA 5083 utilizing the Particle Stimulated Nucleation (PSN) model ...

[Simulation of Flow and Dispersion Around a Surface-Mounted Cube](#)

29 AUG 2003 26 pages

Authors: [Sally A. Cheatham](#); [Jay P. Boris](#); [Bohdan Z. Cybyk](#); [NAVAL RESEARCH LAB WASHINGTON DC](#)

Full Text

The time-accurate computational model FAST3D is used to investigate flow over a cube mounted on a flat surface. The effect of resolution, boundary conditions, and the form of the inflow velocity profile on flow evolution and passive tracer dispersion in the vicinity of the cube is considered. Computational results are compared with wind tunnel and water tank data published by a number of authors. It is found that the flow ...

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