SIXLAB

MEETING PROGRAM

& ENGINEERING MATERIALS AT EXTREME CONDITIONS

BARCELONA SPAIN • October 22–27, 2011

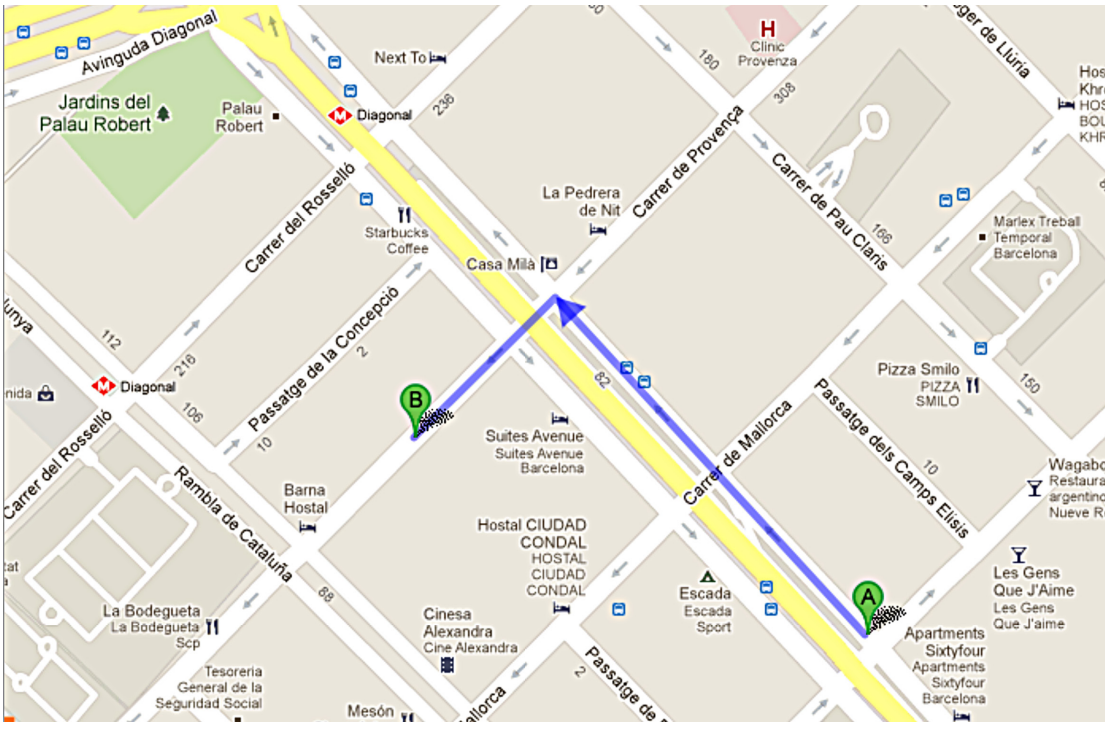
http://www.lanl.gov/programs/asc/6lab.shtml

Engineering & Materials at Extreme Conditions

Wednesday, October 26, 2011

Meeting Dinner at the El Principal Restaurant
(time to be announced)

Directions from the Hotel Majestic (A) to the El Principal Restaurant (B)



Monday, October 24

Time: 0900-1040 • Opening Session		
Presentation Title	**Author(s)**	**Institution**
Key Note	Dimitri Kusnezov	NNSA
Key Note	Oleg Shubin	ROSATOM
Exascale Computing	Cheryl Wampler	LANL
NIF Experiments	Bill Goldstein	LLNL
1040-1100 BREAK		

Time : 1100-1240 • Session 1: Techniques for Dynamic Experiments		
Presentation Title	**Author(s)**	**Institution**
International collaboration on the development and application of proton radiography	Frank Merrill	LANL
Electro-Physical Research Methods for Materials at Extreme Conditions with the Use of Magnetic Generators	Andrey V. Ivanovsky	VNIIEF
Research of Possibility of Radiography in Fast Neutrons by Use of Portable Neutron Generators	Dmitriy I. Yurkov	VNIIA
Dynamic HED Experiments and Theory at the Sandia Z Facility	Thomas Mattson	SNL
New regimes For Supernova-Relevant Laboratory Astrophysics Experiments at the National Ignition Facility	Aaron Miles	LLNL
1240-1400 LUNCH		

Time: 1400-1540 • Session 2: High Energy Density, Plasmas, Magnetic Fields		
Presentation Title	**Author(s)**	**Institution**
High Energy Densities and Mago/MTF	Sergey F. Garanin	VNIIEF
Dynamical Materials Experiments on Sandia's Z Machine: Obtaining Data with High Precision at HED Conditions	Thomas Mattsson	SNL
Experimental Aspects of Shocked Noble Gasses	Seth Root	SNL
Simulation of Plasma Formation at Multi-Megagauss Magnetic Fields	Atchison/Lindemuth	LANL
Numerical Simulations of Wire and Foil Electrical Explosion under Helical EMG Current Drive for Warm Dense Matter Generation	Sergey D. Kuznetsov	VNIIEF
1540-1600 BREAK		

Time: 1600-1740 • Session 3: High Explosive Topics		
Presentation Title	**Author(s)**	**Institution**
Modeling of Non-adiabatic Transitions in Energetic Materials	Andrey Eduardovich Mukhanov	VNIIA
Response of HMX-based HE to low-velocity loading by steel cylindrical impactor	Victor Alexeevich Pushkov	VNIIEF
The Shock-to-Detonation Transition in Explosives --an Overview	Dana Dattlebaum	LANL
Modeling of Detonation Propagation	Tariq Aslam	LANL
Molecular-Dynamics Simulation of the Pressure Effect on Melting Temperature of HE Molecular Crystal	Alexander A. Selezenev	VNIIEF

Tuesday, October 25

Time: 0900-1025 • Session 4: Materials – EOS and Thermodynamic Properties		
Presentation Title	**Author(s)**	**Institution**
Dislocation Densities in Copper and Tantalum upon Shock Loading of up to 20-100 GPa	Alexey M. Podurets	VNIIEF
Measurements of Sound Speeds in Zinc and Titanium Alloys by Optical Method	Alexey Ye Kovolev	VNIIEF
Tera-Pascal Shock Physics Experiment Using Pulsed Power Driver	Chris Rousculp	LANL
Multi-Phase EOS for Cerium	Frank Cherne	LANL
1025-1045 BREAK		

Time: 1045-1225 • Session 5: Constitutive Properties, Strength		
Presentation Title	**Author(s)**	**Institution**
Deterministic Perturbations Developing on Steel Shells under Quasi-Spherical Explosive Loading. Investigation Results Using Data Laser Interferometry and Ultra Small-Direction Gamma-Tomography	Yeugeniy A. Kozlov	VNIITF
Dynamic Strength Experiments at Lawrence Livermore National Laboratory	Robert Cavallo	LLNL
Beryllium Strength Studies Using the Perturbation Growth Method	Alexander I. Lebedev	VNIIEF
Strength Experiments of Iron	Jon Belof	LLNL
Experimental Investigation into Dynamic Properties of Structural Materials to Predict the Behavior of these Materials in Extreme Conditions	A. V. Pavlenko	VNIITF
1225-1400 LUNCH AND SMALL GROUP DISCUSSIONS		

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Tuesday, October 25 (Continued)

Time: 1400-1520 • Session 6: Material Ejecta, Spallation and Damage		
Presentation Title	**Author(s)**	**Institution**
Simulation of Beryllium Spallation	Olga A. Tyupanova	VNIIEF
Characteristics Evaluation of Free Surface Shock-Wave Ejecta	Alla B. Georgievskaya	VNIIEF
New Developments in Ejecta Modeling in the FLAG code	Alan Harrison	LANL
Physical Nature of Metals Longevity in the Dynamic Failure Phenomenon	Alexandr Ya. Uchaev	VNIIEF
1520-1540 BREAK		

Time: 1540-1700 • Session 7: Material Phase Transition, Modeling and Other		
Presentation Title	**Author(s)**	**Institution**
Thermodynamically Consistent Method for Calculation of Free Energy and Equilibrium Curves of First-order Phase Transitions in Classical Molecular Dynamics	A. V. Karavaev	VNIITF
Formation and Recovery of Self-Irradiation and Metalurgical Changes in Pu Alloys	Brandon Chung	LLNL
Relaxation Model of Shear Strength of Five Metals (Aluminum, Beryllium, Copper, Tantalum, Deplete Uranium)	Olga N. Ignatova	VNIIEF
Mathematical Modeling of Irreversible Dynamic Deformation, Micro and Macro Fracture of Materials and Structures	Zakharov Pavel Petrovich	VNIIA

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Wednesday, October 26

Time: 0900-1025 • Session 8: Materials		
Presentation Title	**Author(s)**	**Institution**
Semi-Empirical Models for Shear Modulus in Shock Temperatures and Pressures	V. M. Elkin	VNIIEF
Peculiarities of high-rate deformation of copper with different grain size under convergence of cylindrical channels of small diameter	Andrey N. Malyshev	VNIIEF
Shear and Spall Strength of Hardened 30KhGSA Steel under Explosive Loading in the Range of Solid-Solid Phase Transformation	E. A. Kozlov	VNIIEF
Differentiation of 5f and 6d Components in the Unoccupied Electronic Structure of UO2	Jim Tobin	LLNL
1025-1045 BREAK		

Time: 1045-1225 • Session 9: Computation Physics – MD		
Presentation Title	**Author(s)**	**Institution**
Large-scale Molecular Dynamic of Dense Plasmas: The Cimarron Project	(Belof for…) Frank Graziani	LLNL
DFT and MD Simulation of Self-Diffusion in Silicon: Study of Diffusion Vacancy Mechanism Studies	Andrey V. Anisin	VNIIEF
Atomistic Simulation of Hydrogen Diffusion in Titanium	Alexander Sergueevich Rokhmanenkov	VNIIA
Atomistic Simulation of Slip, Twinning and Phase Transitions in Shocked Metals and Nanocomposites	Tim Germann	LANL
Shock Compression of Hydrocarbon Polymers: A Molecular Dynamics Approach with Comparison to DFT, Continum and Experiment	Matt Lane	SNL
1225-1400 LUNCH		

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Wednesday, October 26 (Continued)

Time: 1400-1520 • Session 10: Computational Physics – Computer Science and Methods		
Presentation Title	**Author(s)**	**Institution**
A Phenomenological Model of Solid Fracture Kinetics Under Pulsed Loading	Sergey Sokolov	VNIIEF
Multi-Material Pressure Relaxation Methods for Lagrangian Hydrodynamics	James Kamm	SNL
ReALE - Reconnection-based Arbitrary Lagrangian-Eulerian Method	Misha Shashkov	LANL
Model of Turbulent Combustion of AL Particle Clouds in Explosions	Allen Kuhl	LLNL
1520-1540 BREAK		

Time: 1540-1720: Session 11 • Computational Physics - Methods		
Presentation Title	**Author(s)**	**Institution**
Computational Challenges of the Hybrid PIC-fluid Fokker-Plank Code for Simulation of Dynamical Processes in Plasma	Igor Glazyrin	VNIITF
Computational Co-Design for Materials in Extreme Environments	Tim Germann	LANL
Anisotropic Material Modeling in the FLAG Hydrocode	Abigail Hunter	LANL
Computational Materials Modeling with Peridynamics	Michael Parks	SNL
Reformulation of the Analytic Solution of the Elastic-Plastic Dynamic Sphere Test Problem	Todd Williams	LANL

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Thursday, October 27

Time: 0900-1025 • Session 12: Engineering and Criticality		
Presentation Title	**Author(s)**	**Institution**
Experimental and Calculated Researches of Nuclear-Physics Characteristics of Assemblies Containing [237Np + 239Pu(98%)] in the Core and Reflector of Natural Uranium	Alexey A. Kajgorodov	VNIIEF
Planning for Critical Assembly Experiments for Stockpile Stewardship and Global Security	Morgan White	LANL
Experimental Researches of Prompt Neutrons Kinetics in Multiplying Systems with Pu Core	Alexey A. Kaygorodov	VNIIEF
Radio Transponder System for Remote Monitoring and Identification of Containers with Fissile Materials	S.V. Katin	NIIS
1025-1045 BREAK		

Time: 1045-1225 • Session 13: Diagnostics Topics		
Presentation Title	**Author(s)**	**Institution**
Radiation Strength of Quartz Glass Fibers at Their Pulsed Irradiation with High-Energy γ-Quanta	Vasiliy V. Grushko	VNIIEF
Diagnostics of Nano- and Picosecond Pulsed Single-Stage Processes	Vasily Petrovich Andrianov	VNIIA
Photonic Doppler Velocimetry Diagnostic for Experiments	David Holtkamp	LANL
Microwave Diagnostics of Dynamic Processes	Anatoly L. Mikhaylov	NIIS
Radio-Frequency Interferometer of Millimeter Range Wavelengths as the Tool to Study Hydrodynamic Flows	S.V. Katin	NIIS
1225-1400 LUNCH		

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Time: 1400-1520 • Confinement, Pulsed Power, Emerging Technologies (Session 14)		
Presentation Title	**Author(s)**	**Institution**
Simulation of Foam Polyurethane Thermal Destruction in Leak Proof Objects	D. S. Antropov	VNIIA
Phenomena and Modeling of Container Pressurization Due to Thermal Decomposition of Polyurethane Foams	Amanda Dodd	SNL
Optimizing Kinetic Energy of Magnetically Driven Solid Liners For Use as Drivers of HEDP Experiments	Walter Atchison	LANL
Helical EMG Application for Material Rheology Studies: Opportunities, Results, and Perspectives	Pavel V. Duday	VNIIEF
1520-1540 BREAK		

Time: 1540-1735 • Session 15: Working Group Summaries
Dynamic Experiments
HED Plasma and Magnetics
High Explosives
Materials
Computational Physics
Diagnostic Topics
Engneering and Criticality
PP and Emerging
Pu Workshop--VNIITF host
Radiation Detection--VNIIA host
ICF Workshop--LLNL host
Supercomputing (VNIIEF host)

Time: 1715-1725 • Closing Session – Additional Papers		
Presentation Title	**Author(s)**	**Institution**
Calculation hierarchy model of dynamic metals failure process	Alexander Ya. Uchaev	VNIIEF
On time boundary of maintainance of functional metal properties under extreme conditions	Nadezhda I. Selchenkova	VNIIEF
Molecular Dynamics Simulation of Elastic and Temperature Waves Propagation in Graphene Crystal	Alexandr A. Selezenev	VNIIEF
Research of Ejecta Processes in Case of Shock Wave Coming to Metal Surface Using Electrophysical Facilities	Vladimir A. Vasyukov	VNIIEF

RUSSIAN ATTENDEES	AFFILIATION
Oleg N. Shubin	Rosatom
Lubov, Kondratenkova	Rosatom, ISTC
Alexander V. Sukhanov	Rosatom
Vasily Petrovich Andrianov	VNIIA
Alexander, Andriyash	VNIIA
Yuri Barmakov	VNIIA
Andrey Eduardovich Mukhanov	VNIIA
Alexander Sergueevich Rokhmanenkov	VNIIA
Antropov Dimitry Sergeevich	VNIIA
Dmitriy I. Yurkov	VNIIA
Pavel Petrovich Zakharov	VNIIA
Alexey Shunevich-Zhitskiy (Interpreter)	VNIIA
Andrey V. Ivanovsky	VNIIEF
Sergey F. Garanin	VNIIEF
Sergey D. Kuznetsov	VNIIEF
Victor Alexeevich Pushkov	VNIIEF
Alexandr A. Selezenev	VNIIEF
Alexey Ye. Kovalyov	VNIIEF
Olga A. Tyupanova	VNIIEF
Alla B. Georgievskaya	VNIIEF
Alexandr Ya. Uchaev	VNIIEF
Olga N. Ignatova	VNIIEF
Andrey V. Anisin	VNIIEF
Sergey Sokolov	VNIIEF
Alexey A. Kaijorodov	VNIIEF
Alexandr I. Lebedev	VNIIEF
Andrey N. Malyshev	VNIIEF
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Svetlana Gorelova (Interpreter)	VNIIEF
Tatyana Zezyulina (Interpreter for LANL)	VNIIEF for LANL
Rimma Zybaerova (Interpreter)	VNIIEF
Anatoly L. Mikhailov	VNIIEF
Sergey Nadeev	VNIIEF
Stanislav V. Katin	NIIIS
Yu.I.Orekhov	NIIIS
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Alexander Pavelenko	VNIITF
Lada Talantova	VNIITF
I.Glazyrin	VNIITF
V.M. Elkin	VNIITF
A.V. Karavaev	VNIITF
E. A. Kozlov	VNIITF
Yury Shangin	VNIITF

This list is current at the time of publication. Updates on attendees are not reflected here.

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Amanda Dodd	Sandia National Laboratories
Thomas Mattson	Sandia National Laboratories
Seth Root	Sandia National Laboratories
Matthew Lane	Sandia National Laboratories
James Kamm	Sandia National Laboratories
Michael Parks	Sandia National Laboratories
Kenneth Struve	Sandia National Laboratories
Larissa McMahon (Interpreter)	Sandia National Laboratories
Cheryl Wampler	Los Alamos National Laboratory
Tariq Aslam	Los Alamos National Laboratory
Timothy Germann	Los Alamos National Laboratory
Mikhail Shashkov	Los Alamos National Laboratory
Abigail Hunter	Los Alamos National Laboratory
Walter Atchison	Los Alamos National Laboratory
Alan Harrison	Los Alamos National Laboratory
Morgan White	Los Alamos National Laboratory
Frank Cherne	Los Alamos National Laboratory
Chris Rousculp	Los Alamos National Laboratory
Dana Dattelbaum	Los Alamos National Laboratory
David Holtkamp	Los Alamos National Laboratory
Jerry Brock	Los Alamos National Laboratory
Robert Reinovsky	Los Alamos National Laboratory
Karen Martinez	Los Alamos National Laboratory
Reeta Garber	Los Alamos National Laboratory
Brandon. W. Chung	Lawrence Livermore National Laboratory
Jonathan Belof	Lawrence Livermore National Laboratory
Allen L. Kuhl	Lawrence Livermore National Laboratory
Robert.M. Cavallo	Lawrence Livermore National Laboratory
James Tobin	Lawrence Livermore National Laboratory
Aaron.R. Miles	Lawrence Livermore National Laboratory
Oleg Schilling	Lawrence Livermore National Laboratory
William Goldstein	Lawrence Livermore National Laboratory
Jonathan Belof for Graziani (no abstract)	Lawrence Livermore National Laboratory
John Maenchen	NNSA
Edgar Lewis	NNSA
Michael Dunning	Lawrence Livermore National Laboratory
Cynthia Nitta	Lawrence Livermore National Laboratory

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NOTES

Columbus Sculpture
BARCELONA, SPAIN

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Sculpture of Jesus being flogged on the Passion Facade, La Sagrada Familia BARCELONA, SPAIN

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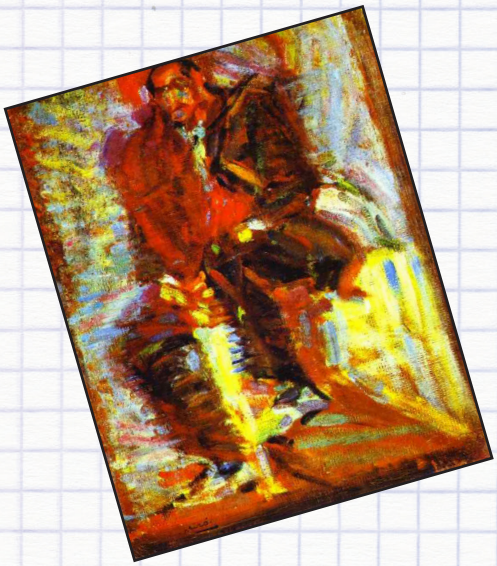

The Farmer (1912-1914) by Joan Miro

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