

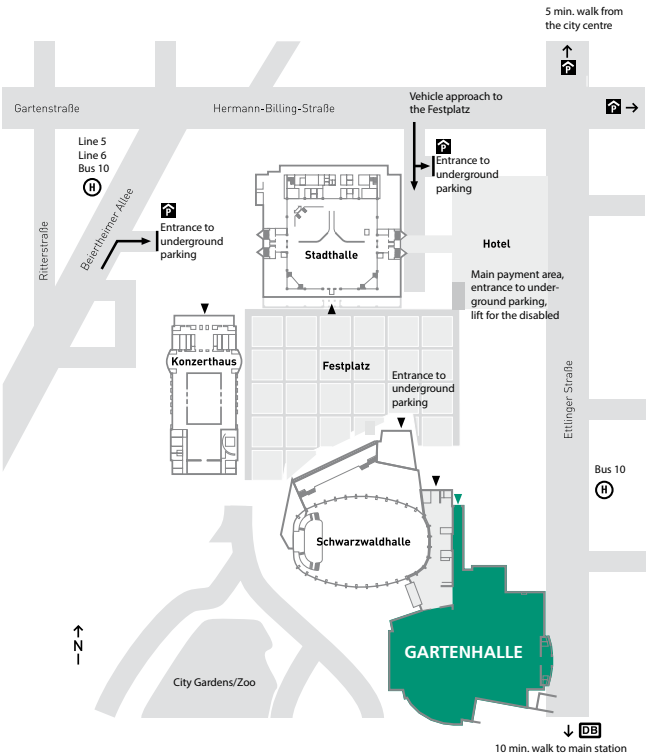
Program

Energetic Materials – Exploring and Understanding

**51st International Annual Conference
of the Fraunhofer ICT**

**June 28 - July 1, 2022
Convention Center, Gartenhalle
Karlsruhe, Germany**

How to find the venue



Karlsruhe is located 120 km south of Frankfurt (Main)/Frankfurt International Airport just beside the Autobahn A5, and is also connected to Frankfurt via the Intercity Express Train ICE.

Additional airports are: Strasbourg (F) (approx. 100 km) and Stuttgart (D) (approx. 90 km)

By car: from all directions, follow traffic signs to »Kongresszentrum«

Congress Center Karlsruhe
Festplatz 9
76137 Karlsruhe
Germany

51st International Annual Conference of the Fraunhofer ICT

International Annual Conferences of the Fraunhofer ICT, with a different emphasis each year, cover scientific and technological progress in the entire field of energetic materials and the related disciplines. Held annually for over 50 years, the conferences have gained worldwide importance, with hundreds of participants from more than 30 nations each year.

Energetic Materials – Exploring and Understanding

For decades, energetic materials have been the subject of R&D in many areas including synthesis, processing and characterization. Established materials – which have been in service for years – are understood in more detail and new materials with special properties are sought and discovered. For this both well-known methods and upcoming techniques such as data mining or novel experimental technologies are important.

The 51st International Annual Conference of the Fraunhofer ICT addresses the full R&D spectrum, from better understanding, improved processing and new formulations to the synthesis of novel compounds, providing both in-depth knowledge and alternative perspectives.

Scientists participating in this conference have the opportunity to present their results and discuss them with their peers, to learn about the needs of the armed forces and to contribute their ideas for the future of energetic materials.

Chairman of the Conference
Dr. Moritz Heil
Fraunhofer ICT, Pfinzthal, Germany

General Information

Registration

- Register online: www.ict.fraunhofer.de/jata2022
- Registration fee (incl. proceedings, coffee breaks, lunch):
€ 850,--
- Participation cannot be guaranteed for registrations arriving after June 17th, 2022. The fee must be paid **upon receipt of the invoice (after the Conference) by bank transfer.**

Cancellation Policy

- **€ 500,--** will be charged for cancellations **after June 20th, 2022. No-shows** will be charged the whole fee.

Accommodation

- Online, see www.ict.fraunhofer.de/annualConference

Conference Office

- **Foyer of the GARTENHALLE**
- Open from Tuesday, June 28, 16.00 h till Thursday, June 30, 17.30 h **during the Conference** and may be reached by Phone +49-(0)7 21 / 37 20 - 6000

Check in / Welcome Reception

- Please check in at the Conference Office on **Tuesday, June 28, between 16.00 and 20.00 h.**
- All participants are cordially invited to the **Welcome Reception** on the same day, starting at **18.00 h** in the foyer of the GARTENHALLE.

Conference Language

- English

Get-together (Thursday, June 30)

- You are invited to join a **Get-together Party** at our Institute with draught beer and barbecue on **Thursday, June 30. Please mark on your registration form whether you wish to participate.**
- Transportation: Bus shuttle Convention Centre Karlsruhe – Fraunhofer ICT and back

Visit of the Institute (Friday, July 1)

- The Fraunhofer ICT can be visited on **Friday, July 1** in the morning. There will be several short tours of the Institute. **Please mark on your registration form whether you wish to participate.** Transportation: Bus shuttle Convention Centre Karlsruhe – Fraunhofer ICT and back

COVID-19 Policy

- In accordance with the applicable regulations in June
- Information will be updated online:
www.ict.fraunhofer.de/annualConference

Wednesday, June 29

08.45 **WELCOME AND OPENING**

M. Heil
Fraunhofer ICT, Pfinztal, D

SESSION I: NEW MATERIALS AND TECHNIQUES

Chair: E. Glascoe
Lawrence Livermore National Laboratory, USA

09.00 **V1 PREPARATION OF NANO METAL OXIDES AND THEIR EFFECT ON THE STABILITY OF NITROCELLULOSE**

M.K. Boulkadid, S. Toudjine, D. Trache, S. Belkhiri,
A. Mezroua, M.I. Aleg, A. Belkebiche
Ecole Militaire Polytechnique EMP, Algiers, ALG

09.25 **V2 ADN SOLID ROCKET PROPELLANTS WITH HIGH BURNING RATES**

S. Sims, S. Fischer, C. Tagliabue
Fraunhofer ICT, Pfinztal, D

09.50 **V3 NEW PAYLOAD CHEMISTRY FOR BLACK-BODY INFRARED DECOY FLARES**

E.-C. Koch
Lutradyn Energetic Materials Science & Technology
Consulting, Kaiserslautern, D

10.15 **V4 ADDITIVE MANUFACTURING PROCESSES APPLIED TO ENERGETIC MATERIALS**

C. Hollands, C. Collet
MSIAC, Brussels, B
A. Wolff
ENSTA, Brest, F

10.40 **Coffee break**

SESSION II: GUN PROPELLANTS

Chair: S. Wilker

BAAINBw, Koblenz, D

- 11.00 **V5** **ADDITIVE MANUFACTURING OF GUN PROPELLANTS AT ISL**
M. Chiroli, F. Ciszek, B. Baschung
ISL, Saint-Louis, F
- 11.25 **V6** **MODELLING OF THE INTERNAL BALLISTICS OF MORTAR INCLUDING POLYDISPERSE GUNPOWDER SIZE**
M. Pautard, C. Coulouarn
Thales LAS France, La Ferte-Saint-Aubin, F
C. Chauveau, F. Halter
CNRS ICARE, Orleans, F
- 11.50 **V7** **25mm GUN DEMONSTRATION OF NITROGEN-DOPED BORON PROPELLANTS**
T. Manning, M. Fair, N. Peabody, V. Panchal, E. Rozumov
US Army RDECOM ARDEC, Picatinny Arsenal, USA
J. Burns
Veritay Inc., East Amherst, USA
P.H. Matter
Ohio State University, USA
- 12.15 **V8** **CARBON BLACK AS SUBSTITUTE FOR CHARCOAL IN BENITE FOR M1002 CARTRIDGE**
L. Lopez
Picatinny Arsenal, USA
- 12.40 **Lunch break**

SESSION III: MECHANICS & SAFETY

Chair: R. Doherty

University of Maryland, USA

- 14.00 **V9** **EFFECT OF MECHANICAL IMPACT ON PBX DISK INVESTIGATED BY DMA**
M.A. Bohn, M.J. Herrmann
Fraunhofer ICT, Pfinztal, D

Wednesday, June 29

14.25 **V10** **CHARACTERIZATION OF PROGRESSIVE DAMAGE EVOLUTION IN POLYMER BONDED EXPLOSIVES**

M. Strobl
Fraunhofer EMI, Freiburg, D
H. Aurich
Fraunhofer EMI, Kandern, D

14.50 **V11** **DAPO-LLM-105: IMPROVING THE PARTICLE MORPHOLOGY AND THERMAL STABILITY**

E. Pasquinet, N. Pin, A. Forzy, P. Palmas, J. Rideau,
A. Beaucamp, E. Laliere, M.-L. Perdrigeat,
S. Quere, C. Barthelt, A. Wuillaume
CEA, Monts, F

15.15 **V12** **WHICH BOND CLEAVAGE IS THE EXPLOSIVE SENSITIVITY MOST SENSITIVE TO?**

J.O. Samseth
FFI, Kjeller, NO

15.40 **Coffee break**

SESSION IV: MACHINE LEARNING AND ENERGETIC MATERIALS

Chair: H. Östmark
FOI, Stockholm, SE

16.00 **V13** **IN SILICO TOXICITY PREDICTION BY SIMILARITY SEARCH AND MACHINE LEARNING ALGORITHM: OPTIMISATION AND VALIDATION OF THE METHOD FOR HIGH ENERGETIC MATERIALS**

M. Fournier, B. Defoort, G. Jacob
ArianeGroup, Saint-Medard-en-Jalles, F
R. Terreux
LBTI, Lyon, F

16.25 **V14** **NEURONAL NETWORK AIDED BURNING RATE DETERMINATION OF ENERGETIC MATERIALS**

J. Langer, S. Knapp, A. Imiolek
Fraunhofer ICT, Pfinztal, D

- 16.50 **V15** **TOWARDS A THEORETICAL DESCRIPTION OF ENERGETIC MATERIALS DECOMPOSITION AND SENSITIVITIES**
R. Claveau, J. Glorian
ISL, Saint Louis, F
D. Mathieu
CEA Le Ripault, Monts, F

Thursday, June 30

SESSION V: KINETICS

Chair: W. de Klerk
TNO Defence, Security and Safety, Rijswijk, NL

- 09.00 **V16** **TOWARDS UNDERSTANDING OF THE COMBUSTION CHEMISTRY OF PROPELLANT FUNCTIONAL GROUPS VIA KINETIC MODELING OF AMYL-NITRITE**
H. Minwegen, K.A. Heufer
RWTH Aachen University, D
J. Glorian, B. Baschung
ISL, Saint-Louis, F
- 09.25 **V17** **DO THE SAFETY PARAMETER (TMR_{adr} , SADT) CHANGE DURING THE LIFE OF THE ENERGETIC MATERIALS? IF YES, HOW MUCH? IF NO, WHY NOT?**
B. Roduit, C.A. Luyet
AKTS SA, Sierre, CH
P. Folly, A. Sarbach, Q. Fatton
armasuisse, Thun, CH
N. Schroeter, R. Baltensperger
University of Applied Sciences of Western Switzerland, Fribourg, CH
- 09.50 **V18** **MODELING PETN-BASED DETONATORS AT ELEVATED TEMPERATURES**
M.L. Hobbs, S.A. Coronel, M.J. Kaneshige
Sandia National Laboratories, Albuquerque, USA

Thursday, June 30

- 10.15 **V19 THE APPLICATION OF EXTREME HEAT FLOW CALORIMETRY TO UNDERSTANDING THE STABILITY OF NITRATE ESTER CONTAINING PROPELLANTS**
R. Pettifer, D. Tod, L. Sullivan
QinetiQ, Sevenoaks Kent, UK
N. Rutter
DOSG UK MOD, Abbey Wood Bristol, UK

10.40 **Coffee break**

SESSION VI – CHARACTERIZATION

Chair: S. Knapp

Fraunhofer ICT, Pfinztal, D

- 11.00 **V20 NEW FINDINGS ON AMORPHOUS ENERGETICS Part I**
R.B. Patel, Z.T. Fondren, V. Stepanov
US Army, Picatinny Arsenal, USA

- 11.25 **V21 NEW FINDINGS ON AMORPHOUS ENERGETICS Part II**
Z.T. Fondren, R.B. Patel, V. Stepanov
US Army, Picatinny Arsenal, USA

- 11.50 **V22 HYDROGEN BONDS IN HTPB AND GAP POLYURETHANES**
N. Desgardin, R. Albiges
ArianeGroup, Vert-le-Petit, F
L. Bouteiller, S. Pensec
IPCM Sorbonne Universite, Paris, F

- 12.15 **V23 SYNTHESIS AND CHARACTERIZATION OF PROMISING NANOSTRUCTURED NITROCELLULOSE DERIVED FROM ALTERNATIVE GIANT REED BIOMASS**
A.F. Tarchoun, D. Trache, A. Abdelaziz, A. Mezroua, H. Boukciat
Ecole Militaire Polytechnique EMP, Algiers, ALG

- 12.40 **Lunch break**
- 14.00 **Poster Pitch (in the lecture hall on stage)**
- 14.45 **Poster Session (in the foyer)**
- 16.15 **Poster Awards** (in the lecture hall on stage)
- 16.30 **Organisational Hints / Closing Remarks**
- 17.30 **Bus Departure from Conference Hall to Fraunhofer ICT**
- 18.00 **Get-together Barbecue Party at ICT**
Bus transfer to some hotels, Karlsruhe City and Main Station
available (starting 19.00 h) during the whole evening

Friday, July 1

- 08.30 **Bus Departure from Conference Hall to ICT**
- 09.00 **Tour of the Institute I**
- 10.30 **Coffee break**
- 10.45 **Tour of the Institute II**
- 12.15 **Refreshment/Snack/ Bus transfer to Karlsruhe**

Poster Program

On Thursday, June 30, 14.00 - 14.45 h there will be a Poster Pitch (in the lecture hall), afterwards a special Poster Session will take place 14.45 - 16.15 h. During this time authors should be present for discussion at their posters in the foyer of the Conference Hall.

P24 STUDY ON BULLET-IMPACT CHARACTERISTICS OF SOLID PROPELLANTS BY NUMERICAL SIMULATION AND EXPERIMENT

Xiaolong Fu, Liping Jiang, Jizhen Li, Chongmin Zhang, Wei Zhang, Wuxi Xie, Xuezhong Fan
Xian Modern Chemistry Research Institute, Xian, PRC

P25 SPRAY FLASH EVAPORATION AND ITS EXTENSIONS: OPPORTUNITIES FOR COMPREHENSION AND FORMULATION OF HIGH PERFORMANCE ENERGETIC MATERIALS

D. Spitzer, Y. Busby
ISL, Saint-Louis, F

P26 MELT CRYSTALLIZATION OF AMMONIUM DINITRAMIDE MIXTURES WITH NUCLEATION ADDITIVES: STRUCTURE ANALYSIS BY MEANS OF X-RAY DIFFRACTION IN ADDITION WITH IMAGING METHODS

M. Herrmann, C. Seidel
Fraunhofer ICT, Pfinztal, D

P27 PAIR DISTRIBUTION FUNCTION ANALYSIS OF AMMONIUM NITRATE – COMPARISON OF PDF- AND RIETVELD-ANALYSIS

P.B. Kempa, M. Herrmann
Fraunhofer ICT, Pfinztal, D

P28 PROCESS AND EQUIPMENT FOR THE SAFE PRODUCTION OF GREEN PRIMARY EXPLOSIVES

S. Fankel, F. Kropp
Josef Meissner GmbH & Co. KG, Köln, D

P29 ADVANCES IN DNB ISOMER MIXTURE SYNTHESIS

C. Sterzenbach, S. Fankel, T. Bergmann
Josef Meissner GmbH & Co. KG, Köln, D

P30 NEW CONTINUOUS PROCESS FOR THE PRODUCTION OF RDX/HMX

J. Pöhlmann, D. Obert, S. Glante
Josef Meissner GmbH & Co. KG, Köln, D

P31 LOW VELOCITY IMPACT AND DAMAGE OF A PRESSED EXPLOSIVE MATERIAL

E. Hamon, D. Picart
CEA Le Ripault, Monts, F
P. Bailly, M. Caliez, A. Frachon, M. Gratton
INSA CVL Universite Orleans, Bourges, F

P32 A STUDY ON THE EVALUATION OF COMBUSTION PERFORMANCE OF VARIOUS PROPELLING CHARGES (BALL POWDER, M2, 35mm, CBI TYPE-II) AND PYROTECHNIC MATERIALS (BPN, MTV) DEPENDING ON THE COMBUSTION VOLUME

B. Dumanlilar, N.E. Dincer Yilmaz
ROKETSAN Missiles Industries, Ankara, TR

P33 THE ACTIVATION ENERGY OF HEXANITROSTILBENE (HNS-IV) AND THE STUDY CHANGES OF THERMAL CHARACTERISTICS OF HNS-IV WITH ACCELERATED AGING

H. Kamal, B. Dumanlilar, K. Aydincak, N.E. Dincer Yilmaz
ROKETSAN Missiles Industries, Ankara, TR

P34 IMPROVEMENT OF RHEOLOGICAL, MECHANICAL AND INTERFACE PROPERTIES OF SOLID ROCKET MOTOR LINER

O. Aslan, N. Özkan
Middle East Technical University, Ankara, TR
G. A. Yilmaz
TUBITAK SAGE, Ankara, TR

P35 PREPARATION AND APPLICATION OF ALUMINUM/MODIFIED FLUORINE RUBBER COMPOSITE FUEL

Bowen Tao, Aiming Pang, Jian Gu
Hubei Institute of Aerospace Chemical Technology, Xiangyang, PRC
Guang Hu
Science and Technology on Aerospace Chemical Power Laboratory,
Xiangyang, PRC

P36 MINIMIZATION OF THE ENVIRONMENTAL FOOTPRINT OF MUNITIONS BY GREENER AND MORE EFFICIENT EXPLOSIVE ORDNANCE DISPOSAL COUNTER CHARGES

D. Brochu, P. Brousseau
DRDC Valcartier Research Centre, CAN

P37 EFFECTS OF VARIOUS FILLERS ON MECHANICAL AND BALLISTIC PROPERTIES OF THE HTPB BASED SLOW BURN COMPOSITE PROPELLANTS

H. Ipek, T. Atalar, Z. Kabasakal, A.F. Zeybek, D. Cetin
TÜBITAK SAGE, Ankara, TR

P38 THE INFLUENCE OF RESONANCE ACOUSTIC MIXING ON THE MECHANICAL PROPERTIES OF AN HTPB/AP PROPELLANT

V. Bladholm, A. Lindborg, D. Miller
FOI, Stockholm, SE

P39 BAYESIAN SENSITIVITY TESTING WITH OPTIMAL DESIGN

D. Christensen
FFI, Kjeller, NO

P40 NEW FINDINGS ON AMORPOUS ENERGETICS

R.B. Patel, Z.T. Fondren, V. Stepanov
US Army, Picatinny Arsenal, USA

P41 LOW TEMPERATURE SENSITIVITY ROCKET PROPELLANT

T. Manning, M. Fair, H. Grau, N. Peabody, E. Rozumov, V. Panchal
US Army RDECOM ARDEC, Picatinny Arsenal, USA

P42 GUN PROPELLANT LOW TEMPERATURE DECOMPOSITION: A NUMERICAL AND EXPERIMENTAL STUDY

J. Ehrhardt, J. Glorian, B. Baschung
ISL, Saint-Louis, F

P43 MULTI-NOZZLE SPRAY SYNTHESIS OF SILVER AZIDE NANOPARTICLES: EARLY STEPS OF A NEW PROCESS

G. Galland, M. Comet, D. Spitzer
ISL, Saint-Louis, F

P44 INVESTIGATION OF DETERRENT DIFFUSION PROFILES IN PROPELLANTS BY IR-MICROSCOPY

M. Kaiser, K. Czepluch, B. Gotzen
WTD 91, Meppen, D

P45 SOLVENT CAST ADDITIVE MANUFACTURING (AM) & TEXTILE TECHNIQUES FOR ENERGETIC MATERIALS (EM)

D. Chaveroux, S. Cuvelier, C. Debiesse
Eurenco, Engis, BE

P46 KINETIC DATA ON THE THERMAL DECOMPOSITION OF RDX IN THE PROCESSING SOLVENTS CYCLOHEXANONE AND GAMMA-BUTYROLACTONE DETERMINED WITH ARC™ AND HEAT FLOW MICROCALORIMETRY

M.A. Bohn
Fraunhofer ICT, Pfinztal, D

P47 PREDICTION OF THE ENTHALPY OF FORMATION BY DFT (DENSITY FUNCTIONAL THEORY) CALCULATIONS

A. Omlor, M.A. Bohn, J. Lang
Fraunhofer ICT, Pfinztal, D

P48 ENTHALPIES OF FORMATION FOR A SELECTION OF NEWER AND CONVENTIONAL STABILIZERS AND REACTION ENTHALPIES FOR THEIR STABILIZATION ACTION IN NITROCELLULOSE

A. Omlor, M.A. Bohn
Fraunhofer ICT, Pfinztal, D

P49 MICROSTRUCTURE OF ALUMINUM HYDRIDE AND STABILIZATION CONCEPTS

M. Herrmann, U. Förter-Barth, P.B. Kempa
Fraunhofer ICT, Pfinztal, D

P50 SPRAY DRYING OF ENERGETIC MATERIALS BY THE EXAMPLE OF AMMONIUM NITRATE AND AMMONIUM DINITRAMIDE

T. Heintz, K. Busch, A. Dresel
Fraunhofer ICT, Pfinztal, D

- P51 PREPARATION OF TRACE EXPLOSIVES STANDARDS BY ADVANCED INKJET PRINTING**
C. Ulrich, S. Müller, G. Wolf, J. Deimling, W. Schweikert, F. Schnürer
Fraunhofer ICT, Pfinztal, D
- P52 ADVANCED SOLUTION FOR THE DESENSITIZATION OF PEROXIDE EXPLOSIVES**
I. Wilhelm, M. Wittek, D. Röseling
Fraunhofer ICT, Pfinztal, D
M. Haertel
Federal Police Technology Center, Lübeck, D
- P53 MODIFICATION OF AMMONIUM DINITRAMIDE (ADN) BY CO-CRYSTALLIZATION WITH CROWN ETHER**
A. Dresel, D. Herrmannsdörfer, M. Herrmann
Fraunhofer ICT, Pfinztal, D
- P54 NEAR INFRARED SPECTRA OF METAL / METAL OXIDE PARTICLE SYSTEMS AND ANALYSIS WITH PRINCIPLE COMPONENT ANALYSIS OPTIMIZING THERMITE SYSTEMS**
W. Becker, K. Haß, M. Klemenz, S. Knapp
Fraunhofer ICT, Pfinztal, D
- P55 PROCEDURE TO DETERMINE THE STABILITY OF AN H₂O₂/ WATER/ADN/AN SYSTEM USING MULTIVARIATE METHODS**
W. Becker, V. Weiser, E. Roth, K. Sachsenheimer, S. Knapp
Fraunhofer ICT, Pfinztal, D
- P56 PRESSURIZED SILICON COMBUSTION FOR PYROTECHNIC AND ENERGETIC USE**
V. Weiser, M. Juez-Lorenzo, S. Kelzenberg, S. Knapp, A. Koleczko,
V. Kuchenreuther-Hummel, E. Roth, T. Schäfer
Fraunhofer ICT, Pfinztal, D
- P57 INVESTIGATION OF THE COMBUSTION OF SILICON PARTICLES IN AIR AND THEIR REACTION PRODUCTS**
T. Schäfer, V. Weiser, A. Raab, E. Roth, D. Bieroth, A. Koleczko,
S. Knapp
Fraunhofer ICT, Pfinztal, D

P58 INFLUENCE OF COMPOSITION AND PRESSURE ON THE REACTION BEHAVIOUR OF TERNARY THERMITE MIXTURES CONTAINING Al/MoO₃/WO₃

V. Weiser, M. Mosinzny, S. Knapp, E. Roth, S. Kelzenberg
Fraunhofer ICT, Pfinztal, D

P59 INFLUENCE OF POROSITY AND AMBIENT PRESSURE ON THE BURN RATE OF THERMITE MIXTURES

S. Knapp, W. Becker, K. Wacker, K. Hennig, V. Weiser
Fraunhofer ICT, Pfinztal, D

P60 SIMULATION AND ANALYSIS OF PYROTECHNIC PARTICLE MIXING

K. Haß, S. Knapp, E. Pietsch, K. Wacker, V. Weiser
Fraunhofer ICT, Pfinztal, D

P61 SHS SYNTHESIS OF NANOSTRUCTURED BORON MICROPARTICLES

E. Pietsch, S. Kelzenberg, A. Raab, E. Roth, V. Weiser
Fraunhofer ICT, Pfinztal, D

P62 HOT-SPOT-MODELLING TO SIMULATE THE INFLUENCE OF PARTICLE PROPERTIES ON IGNITION OF SOLID PROPELLANTS

S. Kelzenberg, V. Weiser, S. Knapp
Fraunhofer ICT, Pfinztal, D

P63 EXAMINATION OF CESIUM DINITRAMIDE AS A PYROTECHNIC OXIDIZER

E. Roth, A. Raab, A. Schreiber, S. Knapp, V. Weiser
Fraunhofer ICT, Pfinztal, D

P64 DOWNSCALING THE METHODOLOGY FOR DETERMINING DETONATION VELOCITIES APPLIED TO SMALL SAMPLE QUANTITIES OF EXPLOSIVES

T. Baust
Fraunhofer ICT, Pfinztal, D

P65 INFLUENCE OF THE SHOCK PULSE DURATION DEFINITION ON THE LOCATION OF THE INITIATION THRESHOLD IN THE JAMES CRITERION

C. Zimmermann, S. Wurster
Fraunhofer ICT, Pfinztal, D

P66 TESTS AND CHARACTERIZATIONS OF REPRESENTATIVE SAMPLES OF TNT, AMATOL AND COMP-B WASHOUT LINES

Y. Kelgokmen, M. Öztürk
Roketsan Inc., Ankara, TR

P67 SIMULATION OF THE INFLUENCE OF PROPELLANT GRAIN GEOMETRY ON LOADING DENSITY

M. Lietz, S. Wurster
Fraunhofer ICT, Pfinztal, D

P68 EROSION TEST FACILITY FOR SMALL CALIBER BORES

V. Kuchenreuther-Hummel, M. Lietz
Fraunhofer ICT, Pfinztal, D

P69 CRYSTALLIZATION BEHAVIOR OF ADN DROPLETS IN MICROFLUIDIC EMULSION CRYSTALLIZATION PROCESS

L. Radulescu
Fraunhofer ICT, Pfinztal, D

P70 3D PRINTED GUN PROPELLANTS BASED ON GAP-ETPE

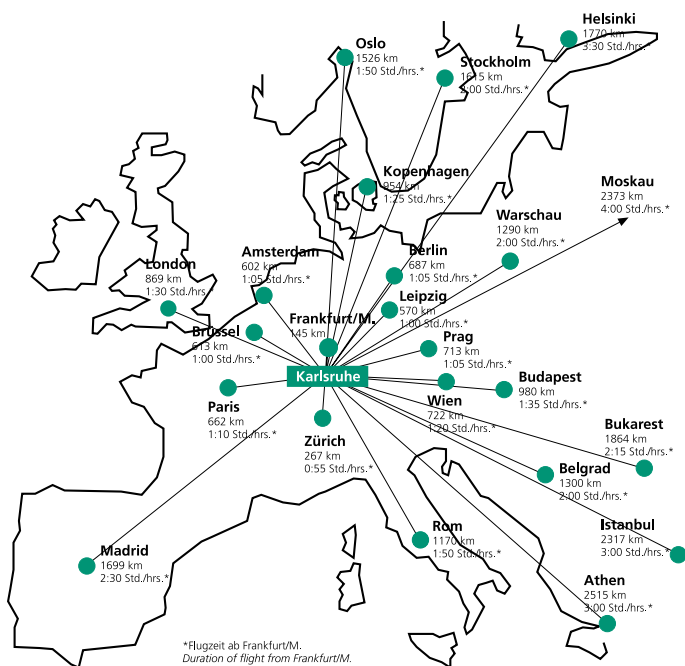
D. Mitro, J. Böhnlein-Mauß, M. Cäsar
Fraunhofer ICT, Pfinztal, D

P71 SURFACE ENHANCED RAMAN SPECTROSCOPY SERS INVESTIGATION OF ENHANCEMENT FACTORS

S. Müller, A. Mendl, W. Schweikert, F. Schnürer
Fraunhofer ICT, Pfinztal, D

P72 ENGINEERED LOW POROSITY POLYMERS WITHIN ADDITIVELY MANUFACTURED POLYACRYLATES

E. Caravaca, D.T. Bird
US Army DEVCOM-AC, Picatinny, USA
R. Nuggehalli
New Jersey Institute of Technology, Newark, USA



Welcome to the Heart of Europe

51st International Annual Conference
of the Fraunhofer ICT

June 28 - July 1, 2022
Karlsruhe, Germany

Conference Management

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