

CZECH AND GERMAN NATIONAL COMMITTEE FOR COOPERATION  
WITH THE INTERNATIONAL INSTITUTE OF REFRIGERATION (IIR)

The 12<sup>th</sup>  
**CRYOGENICS 2012**  
IIR International Conference



Dresden, Germany  
September 11 – 14, 2012

**INSTITUT INTERNATIONAL DU FROID**  
**INTERNATIONAL INSTITUTE OF REFRIGERATION**  
Commissions A1, A2 and C1



**PROGRAMME**

## PROGRAMME IN DETAIL

**MONDAY, SEPTEMBER 10, 2012**

### REGISTRATION

16:00 – 19:00

### WELCOME PARTY

19:00 – 21:00

**TUESDAY, SEPTEMBER 11, 2012**

### OPENING CEREMONY

Chair: Chrz V., Herzog R., Scurlock R., Coulomb D., Lebrun P.

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**09:00**      **Opening Ceremony**

### I. CRYOGENICS IN PARTICLE PHYSICS

Chair: Lebrun P., Herzog R.

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**09:20 001**    **Cryogenics for the Future Accelerator Complex NICA at JINR**

Agapov N.

**09:45 009**    **Development of a Two-Phase Thermosiphon for Extreme Cooling Requirements in the Tritium Source of KATRIN**

Grohmann S.

**10:10 010**    **Thermal Design of Cryogenic Permanent Magnet Undulator for SLS**

Anghel A.

**10:35 036**    **Analysis of the SIS100 Superconducting Magnet Cooling**

Bleile A.

### COFFEE BREAK

11:00 – 11:25

### II. CRYOGENICS IN PARTICLE PHYSICS & FUSION

Chair: Herzog R., Agapov N.

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**11:25 030**    **Design, Manufacturing and Assembly of the Cryogenic Transfer Line for XFEL/AMTF**

Chorowski M.

**11:50 020**    **Design proposal for MITICA Cryogenic Plant**

Valente M.

**12:15 018**    **The MITICA Facility: A Possible Optimization of the Cryogenic Plant Cooling capacity**

Fellin F.

**12:40 095**    **Cryogenics for the European Spallation Source**

Wang X.

### LUNCH BREAK

13:05 – 14:00

### III. SUPERCONDUCTIVITY AND ITS APPLICATIONS

Chair: Lebrun P., Kade A.

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**14:00 002**    **Experimental Study of Superconducting Magnets for the NICA Accelerator Complex**

Khodzhibagiyan H.

**14:25 037**    **Measurement of Dynamic Heat Losses in the Fast Ramped Superconducting Magnets for the SIS100 Synchrotron**

Bleile A.

**14:50 026**    **The cryogenic system of the 43 T Hybrid magnet of LNCMI Grenoble, France**

Ronayette L.

- 15:15 054 Cooling Systems for Superconducting Power Applications – Experiences Gained in HTS Cable and Fault-Current Limiter Projects**  
Hobl A.
- 15:40 051 Components and Systems for HTS Applications**  
Kade A.

**COFFEE BREAK**

**16:05 – 16:30**

**IV. SUPERCONDUCTIVITY & VERY LOW TEMPERATURES**

Chair: Herzog R., Kralik T.

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- 16:30 015 Superconducting Current Feeders System for SST-1**  
Gupta N.C.
- 16:55 042 Study of Refrigeration Characteristics of Slush Nitrogen in Flow System**  
Nakamura N.
- 17:20 079 Modern Ways of Reaching and Using Millikelvin Temperatures**  
Wernicke D.
- 17:45 053 Compact Dilution Refrigerator for Sensor Cooling**  
Schneider M.
- 18:10 073 The AEGIS' Low Temperature System**  
Eisel T.

**WEDNESDAY, SEPTEMBER 12, 2012**

**V. CRYOCOOLERS, LIQUID HELIUM**

Chair: Thummes G., Kaiser G.

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- 08:30 039 A 3-Dimensional Numerical Study a Co-Axial type Acoustic Stirling Cryocooler**  
Farouk B.
- 08:55 038 Effects of the Inertance Tube on Pulse Tube Refrigerator Performance**  
Farouk B.
- 09:20 052 3-Cycle Pulse Tube Cooler for Cryogenic High-Power Applications**  
Kuhn M.
- 09:45 008 Low Temperature Phase Equilibria of Refrigerant Mixtures**  
Winkelmann D.
- 10:10 088 Studies of Adsorption Characteristics of Activated Carbons down to 4.5K for Development of Cryosorption Pumps**  
Kasthurirengan S.

**COFFEE BREAK**

**10:35 – 11:00**



Coffee Breaks on Wednesday are sponsored by

**VI. CRYOTHERAPY, CRYOBIOLOGY**

Chair: Mericka P., Schumacher H.M.

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- 11:00 006 Cryotherapy State-of-art and Challenges in Poland**  
Piotrowska A.
- 11:25 077 Study of Contact Methods to Cool Biological Tissue in Local Cryosurgery**  
Butorina A.
- 11:50 004 Application of the Very Low Temperatures for the Preservation of Rare Plants' Seeds of Ukraine**  
Arapetyan E.
- 12:15 094 A Preliminary Method for Ultra-Rapid Freezing of the Nicotiana Tabacum BY-2 Cell Line by Encapsulation/Vitrification**  
Schumacher H.M.

- 12:40 074 Standardization of the Cryopreservation Process for Parathyroid Glands**  
Von Walcke-Wulffen

**LUNCH BREAK**

**13:05 – 14:00**

**VII. AIR SEPARATION AND PRODUCT STORAGE, CO<sub>2</sub> SEQUESTRATION**

Chair: Chrz V., Kalbassi M.

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- 14:00 058 Air Separation Unit Installation and Qualification at the French Guyana Space Centre**  
Burdaszewski P.
- 14:25 032 Advanced Cryogenic Process for Low Purity Oxygen Production**  
Kirchner L.
- 14:50 085 Oxygen Supply for CO<sub>2</sub> Capture by Oxyfuel Coal Combustion**  
Kalbassi M.
- 15:15 007 Thermodynamic Analysis of Liquid Oxygen Production System Based on Coupling Joule-Thomson Cooler with PSA**  
Piotrowska A.
- 15:40 078 Feasibility Study of "CO<sub>2</sub> Free Hydrogen Chain" Utilizing Australian Brown Coal Linked with CCS**  
Inoue K.

**COFFEE BREAK**

**16:05 – 16:30**



Coffee Breaks on Wednesday are sponsored by

**VIII. MISCELLANEOUS**

Chair: Klier J., Vins M.

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- 16:30 076 Thermosiphon Tanks for Reliable Pump Operation**  
Hnizdil T.
- 16:55 045 Numerical Simulation of Mixed Convection Heat Transfer to Forced Flow Supercritical Helium**  
Ghosh P.
- 17:20 055 Presentation of the German DIN Working Group – Safety Devices for Helium Cryostats**  
Süsser M.

**POSTER SESSION - INTRODUCTION**

**17:45 – 17:55**

**POSTER SESSION**

**17:55 – 19:00**

**SUPERCONDUCTIVE MATERIALS AND MAGNETS**

- A1 013 Design of a superconducting inductor for axial concentration flux motor**  
Ailam E.H.
- A1 016 Stability of YBCO coated conductor according to Cu stabilizer thickness for cryogenic applications**  
Bae J.H.
- A1 033 Properties of impregnated superconducting coils made from YBCO coated conductor using different technology of impregnation**  
Frolek L.
- A1 049 Study of Heat Electrodynamics Processes in High Temperature Superconductors (HTSC) Taking into Account Defects of Their Internal Structure**  
Dontsova E.

- A1 086 Critical Current Degradation Analysis in Irradiated Superconducting Materials**  
Sosnowski J.
- A1 093 Opportunities for Improving the Electrochemical Characteristics of Ni-Zn Batteries Using High Temperature Superconducting Ceramic**  
Dimitrov D.
- A1 056 Superconducting Unclosed Shields for Improving Homogeneity of the Magnetic Field in Magnetic Systems**  
Kulikov E.

#### **CRYOCOOLERS AND COOLING OF SUPERCONDUCTIVE SYSTEMS**

- A1 019 Cool-down processes of NICA accelerator complex**  
Mitrofanova Y.A.
- A1 021 Liquid cryogen targets for experiments in nuclear relativistic and particle physics**  
Konstantinov A.V.
- A1 062 Studies of Performance Characteristics of Twin Thermoacoustic Prime Mover with Gas Mixtures as Working Fluids**  
Behera U.
- A1 068 High-Power Stirling-Type Pulse Tube Cryocooler for Operation near 80 K**  
Thummes G.
- A1 065 Cryogenic System of Superconducting Separator for Kaon Channel of IHEP Accelerator**  
Kozub S.
- A1 090 Status of the Cryogenic System for the Ariel E-Linac at Triumf**  
Sitnikov A.

#### **HEAT TRANSFER**

- A1 017 The cryogenic insulation characteristics of GFRP in Liquid Nitrogen**  
Kim H.J.
- A1 071 Cryogenic He experiment on natural turbulent convection**  
Kralik T.
- A1 072 Radiative heat transfer at low temperatures over microscopic distances in vacuo**  
Kralik T.
- A2 027 Design of a cryogenic helium plate-fin heat exchanger**  
Hu Z.J.

#### **LIQUID HYDROGEN**

- A1/2 025 Cryogenic hydrogen storage in highly porous materials - A modelling approach**  
Schlemminger Ch.
- A1/2 069 The development of methods and means of gasification of liquid hydrogen under supercritical parameters**  
Cheremnykh O. Ya.
- A1/2 082 The development of methods and means of evacuation of hydrogen from tanks of a space flying apparatus under supercritical parameters**  
Cheremnykh O. Ya.

#### **LNG**

- A2 091 Computer program for simulating the rollover phenomenon during the storage of the stratified layers of liquefied natural gas**  
Belgacem A.

#### **AIR SEPARATION**

- A2 023 Mixtures on basis of rare gases. Application and methods of production**  
Bondarenko V.L.

- A2 028 Development of an Equation of State for the Representation of Solid-Liquid, Solid-Vapour, and Liquid-Vapour Equilibria of Substances of Interest for the Air Distillation Process**  
Campestrini M.
- A2 029 Study Concerning the Possibility for Increasing Argon Recovery from a Cryogenic Air Separation Process**  
Popa V.
- A2 034 Test procedures for cryogenic components and considerations for leakage measurement**  
Boersch M.
- A2 083 Study on the Miniature Turbo-Expander of Reverse Brayton Cryocooler at 100 K**  
Hou Y.
- A2 084 Experimental investigation on the thermodynamic performance of turbo-expander in two phases**  
Hou Y.

### **CRYOSURGERY**

- C1 048 Dreams and Reality of Superhigh Frequency Cryogenic Technology in Surgery**  
Butorina A.

**THURSDAY, SEPTEMBER 13, 2012**

### **IX. LIQUEFIED NATURAL GAS (LNG)**

Chair: Scurlock R., Schustr P.

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- 08:30 031 Conceptual Design of an Efficient Small LNG Production Facility**  
Quack H.
- 08:55 041 A multiobjective optimization for micro-scale liquefaction plants**  
Arteconi A.
- 09:20 040 LNG as vehicle fuel in Italy**  
Arteconi A.
- 09:45 047 Exergy Analysis to Determine Appropriate Design and Operating Parameters for Collins Refrigerator-Liquefier under Mixed Mode Operation**  
Chowdhury K.

### **COFFEE BREAK**

**10:10 – 10:35**

### **X. CRYOBIOLOGY AND -TECHNOLOGY**

Chair: Todorovich M., Spörl G.

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- 10:35 046 Analysis on protein stability in Tris buffered purified bulk solutions during the freezing process**  
Heidingsfelder J.
- 11:00 003 Coupled Transport of Water and Cryoprotectant across Cell Membranes and Applications to Cryopreservation**  
Weng L.
- 11:25 064 Biological and technological challenges establishing a future-proof cryogenic biomaterialbank**  
Ciba P.
- 11:50 087 Cryopreservation of mesenchymal stromal cells by vitrification in multicomponent solutions**  
Petrenko A.
- 12:15 070 Safety and Quality Assurance in Donation, Harvest and Preservation of Cells and Tissues of Human Origin – A Review of Own Experience**  
Mericka P.

## LUNCH BREAK

12:40 – 14:00

Lunch & Meeting of Commissions of the IIR

## XI. LIQUID HYDROGEN

Chair: Haberstroh C., Bondarenko A.

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- 14:00 067 Thermophysical Properties of Hydrogen and Deuterium at all Ortho-Para Compositions**  
Leachman J.
- 14:25 080 Principles for the liquefaction of hydrogen with emphasis on pre-cooling processes**  
Walnum H.T.
- 14:50 081 Search for the Best Processes to Liquefy Hydrogen in Very Large Plants**  
Quack H.
- 15:15 061 The development of methods and means for long-term storage of liquid hydrogen of high purity**  
Cheremnykh O.
- 15:40 050 A new cryogenic high-pressure H<sub>2</sub> test area: First results**  
Klier J.

## COFFEE BREAK

16:05 – 16:30

## XII. RARE GASES

Chair: Arkharov A., Lansky M.

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- 16:30 059 Assessment of the Storage of Crude Helium in Reserves in Europe and elsewhere**  
Clarke R.H.
- 16:55 024 Cascade units for neon isotope production by rectification method**  
Bondarenko A.
- 17:20 022 Enrichment of rare gases concentrates with application of diaphragm technologies**  
Bondarenko A.
- 17:45 060 The Future of Helium? A Global Agency to Oversee Production, Storage, Supply and Use of Helium Gas and Liquid**  
Scurlock R.

## CLOSING CEREMONY

Chair: Chrz V., Herzog R., Scurlock R., Coulomb D., Lebrun P.

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18:10 – 18:30

## CONFERENCE DINNER

19:30 – 23:30

The conference dinner is sponsored by



ILK Dresden

