

# Program

## Monday October 15

9:30-9:50 **Opening Address @** Room 1 (Main Hall)

### <Room 1 (Main Hall)> **Plenary Lecture 1, 2**

9:50-11:10 **Chair:** H. Yasuda

9:50-10:30 **Plenary 1**  
**Improvement of the Properties of Light Metal Matrix Micro/Nanocomposite Materials : Myth or Reality?**

M. Garrido, L. Davoust, R. Daudin, L. Salvo, Y. Fautrelle  
*Grenoble Polytechnic Institute, SIMaP Laboratory*

10:30-11:10 **Plenary 2**  
**Progress in Research on Solidification of Alloys under a Strong Magnetic Field**

Z. Ren, X. Li, J. Wang  
*Shanghai University*

11:10-11:20 **Photo @** Room 1 (Main Hall)

11:20-13:10 **Lunch**

### <Room 1 (Main Hall)> **EM Shaping, Forming, Levitation 1**

13:10-15:00 **Chairs:** J. Kolesnikovs / T. Miyake

13:10-13:40 **Keynote**  
**Electromagnetic Sensor Just Below CC Mold by Using Magnetic Transformation of Steel**

H. Harada<sup>1</sup>, M. Nagashima<sup>1</sup>, T. Konno<sup>1</sup>, M. Yamana<sup>1</sup>, T. Toh<sup>2</sup>  
<sup>1</sup>*Nippon Steel & Sumitomo Metal Corporation*, <sup>2</sup>*Nippon Steel & Sumikin Technology Co.Ltd*

13:40-14:00 **Real-time Control of the Mould Flow in a Model of Continuous Casting in Frame of the TOMOCON Project**

T. Wondrak<sup>1</sup>, U. Hampel<sup>1</sup>, M. Ratajczak<sup>1</sup>, I. Glavinic<sup>1</sup>, F. Stefani<sup>1</sup>, S. Eckert<sup>1</sup>, D. van der Plas<sup>2</sup>, P. Pennerstorfer<sup>3</sup>, I. Muttakin<sup>4</sup>, M. Soleimani<sup>4</sup>, S. Abouelazayem<sup>5</sup>, J. Hlava<sup>5</sup>, A. Blishchik<sup>6</sup>, S. Kenjeres<sup>6</sup>  
<sup>1</sup>*Helmholtz-Zentrum Dresden - Rossendorf*, <sup>2</sup>*Tata Steel*, <sup>3</sup>*Primetals Technologies Austria*, <sup>4</sup>*University of Bath*, <sup>5</sup>*Technical University of Liberec*, <sup>6</sup>*Delft University of Technology*

14:00-14:20 **Application of Modulated Calorimetry to the Liquid Metals Using Electromagnetic Levitation and Static Magnetic Field**

O. Budenkova<sup>1</sup>, M. Milgravis<sup>2</sup>, Ch. Garnier<sup>1</sup>, A. Gagnoud<sup>1</sup>, Y. Delannoy<sup>1</sup>, S. Semenov<sup>1</sup>, P. Chometon<sup>1</sup>, S. Rivoirard<sup>1</sup>, M. Alamir<sup>1</sup>, J. Etay<sup>1</sup>  
<sup>1</sup>*Univ. Grenoble Alpes*, <sup>2</sup>*University of Latvia*

14:20-14:40 **Experimental Study on the Behaviour of the Submerged Jet in a Cold Liquid Metal Model for Continuous Casting of Round Blooms under the Influence of Rotating Magnetic Fields**

D. Schurmann, B. Willers, S. Eckert  
*Helmholtz-Zentrum Dresden-Rossendorf e.V. (HZDR)*

14:40-15:00 **Electromagnetic Flow Rate Measurement in Molten Tin Circulating in a Closed-loop Test System**

Z. Lyu, Ch. Karcher, Y. Kolesnikov, Th. Boeck  
*Technische Universität Ilmenau*

15:10-15:40 **Coffee Break**

## <Room 1 (Main Hall)> Measurement Technique 1

- 15:40-17:20 **Chairs:** G. Racineux / A. Matsui
- 15:40-16:00 **Visualisation of the Large Scale Circulation in Rayleigh-Bénard Convection Using Contactless Inductive Flow Tomography**  
T. Wondrak, F. Stefani, V. Galindo, S. Eckert  
*Helmholtz-Zentrum Dresden - Rossendorf*
- 16:00-16:20 **Transient Eddy Current Flow Metering: A Calibration-free Velocity Measurement Technique for Liquid Metals**  
N. Krauter, F. Stefani  
*Helmholtz Zentrum Dresden Rossendorf*
- 16:20-16:40 **Lorentz Force Velocimetry Using a Bulk HTS Magnet System**  
O. Vakaliuk, B. Halbedel  
*Technische Universität Ilmenau*
- 16:40-17:00 **A Precise Magnetic Flux Leakage Method for the Defects Detection within the Steel Thin Sheet**  
 B. Wang, X. Wang  
*University of Chinese Academy of Science*
- 17:00-17:20 **Thermophysical Properties Measurement of Highly Undercooled Ni-Based Alloy Melts by Electromagnetic Levitation Method**  
H.P. Wang, K. Zhou, J. Chang, B. Wei  
*Northwestern Polytechnical University*

## <Room 1 (Main Hall)> EM Shaping, Forming, Levitation 2

- 17:20-18:00 **Chairs:** G. Racineux / A. Matsui
- 17:20-17:40 **Application of Magnetic Pulse and Electrohydraulic Processes to Forming and Crimping**  
G. Racineux<sup>1</sup>, C. Sow<sup>2</sup>, G. Bazin<sup>3</sup>, S. Marya<sup>1</sup>  
<sup>1</sup>Ecole Centrale de Nantes, <sup>2</sup>IRT Jules Verne, <sup>3</sup>STELIA Aerospace
- 17:40-18:00 **Electromagnetic Processing for Elaboration of Dissimilar Joints. Case Studies with Aluminium**  
S. Marya<sup>1</sup>, M.-N. Avettand-Fènoël<sup>2</sup>, C. Khalil<sup>1</sup>, G. Racineux<sup>1</sup>  
<sup>1</sup>Ecole Centrale de Nantes, <sup>2</sup>Université Lille

## <Room 2 (Reception Hall)> Solidification, Crystal Growth 1

- 13:10-14:40 **Chairs:** G. Gerbeth / K. Yamamoto
- 13:10-13:40 **Keynote**  
**Experimental Investigation on the Buoyancy-induced Flow in a Model of the Czochralski Crystal Growth Process**  
 J. Pal<sup>1</sup>, S. Franke<sup>2</sup>, S. Eckert<sup>2</sup>, G. Gerbeth<sup>2</sup>  
<sup>1</sup>HZDR Innovation GmbH, <sup>2</sup>Helmholtz-Zentrum Dresden-Rossendorf (HZDR)
- 13:40-14:00 **Thermophysical Properties of Liquid Ti-Si Alloys Measured by EML**  
K. Zhou, P. Lü, H. Wang, B. Wei  
*Northwestern Polytechnical University*
- 14:00-14:20 **Effect of a Transverse Static Magnetic Field on the Temperature Gradient during Directional Solidification**  
Z. Shen, Y. Zhong, L. Dong, L. Fan, T. Zheng, H. Wang, W. Ren, C. Li, W. Xuan, Z. Ren  
*Shanghai University*

14:20-14:40 **Effect of Travelling Magnetic Field Inductor Characteristics on the Liquid Metal Flow in a Rectangular Cell**  
E. Shvydkiy<sup>1</sup>, I. Kolesnichenko<sup>2</sup>, R. Khalilov<sup>2</sup>, A. Pavlinov<sup>2</sup>, G. Losev<sup>2</sup>  
<sup>1</sup>Ural Federal University, <sup>2</sup>ICMM UB RAS

15:10-15:40 **Coffee Break**

### <Room 2 (Reception Hall)> **Melt Flow Control 1**

15:40-17:20 **Chairs:** K. Ueno / Y. Delannoy

15:40-16:00 **Experimental Study of Liquid Metal Flows under Volute Traveling Magnetic Fields**  
K. Ueno<sup>1</sup>, T. Kamada<sup>2</sup>  
<sup>1</sup>Iwate University, <sup>2</sup>Tohoku University

16:00-16:20 **Convective End Effects in Annular Linear Induction Pumps**  
Y. Delannoy<sup>1</sup>, E. Martin-Lopez<sup>2</sup>, F. Benoit<sup>2</sup>  
<sup>1</sup>Univ. Grenoble Alpes, <sup>2</sup>CEA CADARACHE

16:20-16:40 **Online Flow Control with Mold Flow Measurements and Simultaneous EM Braking and Stirring**  
M. Sedén, N. Jacobson  
 ABB AB

16:40-17:00 **Linear Stability of Parallel Flow of Liquid Metal in a Rectangular Duct Driven by a Constant Pressure Gradient under the Influence of a Uniform Magnetic Field**  
T. Tagawa  
 Tokyo Metropolitan University

17:00-17:20 **Performance Maps of a High Flowrate EM Pump Experimental and Numerical Analysis**  
S. Vitry<sup>1</sup>, E. Martin-Lopez<sup>1</sup>, F. Benoit<sup>1</sup>, L. Cachon<sup>1</sup>, L. Goldsteins<sup>2</sup>  
<sup>1</sup>CEA Cadarache, <sup>2</sup>University of Latvia

### <Room 3 (301)> **Electromagnetic Melting 1**

13:10-15:10 **Chairs:** H. Funagane / H. Su

13:10-13:30 **Electron Beam Melting toward Inclusion-free Titanium Alloys**  
H. Funagane  
 Nippon Steel and Sumitomo Metal Corporation

13:30-13:50 **Electroslag Process for Better Titanium Deposition Morphology**  
E. Platacis<sup>1</sup>, I. Kaldre<sup>1</sup>, E. Blumbergs<sup>1</sup>, V. Serga<sup>2</sup>  
<sup>1</sup>University of Latvia, <sup>2</sup>Riga Technical University

13:50-14:10 **Rapid Solidification of Ni-Zr Peritectic Alloy under Electromagnetic Levitation Condition**  
P. Lü, H.P. Wang, B. Wei  
 Northwestern Polytechnical University

14:10-14:30 **The Effect of Electromagnetic Field on Microstructure of Ni-Based Single Crystal Superalloys**  
H. Su, C. Liu, J. Zhang, L. Liu, H. Fu  
 Northwestern Polytechnical University

14:30-14:50 **Pulse Electromagnetic Force Microstructural Control at Continuous Billet Casting 7xxx Al-alloys**  
M.A. Slazhniev, K.H. Kim, H.S. Sim, S.W. Kim, W.J. Kim  
 Dong San Tech. Co., Ltd.

14:50-15:10 **MHD-physical Modification Effect on Microstructure Control of the 7xxx High-strength Al-alloys**  
S.W. Kim, M.A. Slazhniev, K.H. Kim, H.S. Sim, W.J. Kim  
 Dong San Tech. Co., Ltd.

15:10-15:40 **Coffee Break**

**<Room 3 (301)> EM Processes 1**

15:40-17:50 **Chairs:** A.L. Daltin / T. Kozuka

15:40-16:10 **Keynote**

**Nucleation and Crystal Growth in Magneto-electrodeposition**

A.L. Daltin, M. Benaissa, J.P. Chopart

*URCA*

16:10-16:30 **Determination of the Properties of Ionic Vacancy by Magnetic Field**

R. Aogaki<sup>1,10</sup>, A. Sugiyama<sup>2,3,10</sup>, M. Miura<sup>4</sup>, Y. Oshikiri<sup>5</sup>, M. Miura<sup>6</sup>, R. Morimoto<sup>7</sup>, I. Mogi<sup>8</sup>, S. Takagi<sup>9</sup>, Y. Yamauchi<sup>10</sup>

<sup>1</sup>*Polytechnic Univ.*, <sup>2</sup>*Yoshino Denka Kogyo, Inc.*, <sup>3</sup>*Waseda Univ.*, <sup>4</sup>*Hokkaido Polytechnic College*,

<sup>5</sup>*Yamagata College of Industry and Technology*, <sup>6</sup>*Polytechnic Center Kimitsu*,

<sup>7</sup>*Saitama Industrial Technology Center*, <sup>8</sup>*Tohoku Univ.*, <sup>9</sup>*Koriyama Technical Academy*,

<sup>10</sup>*National Institute for Materials Science*

16:30-16:50 **Effects of Vertical MHD Flows and Cell Rotation on Surface Chirality in Magneto-electrodeposition**

I. Mogi<sup>1</sup>, R. Morimoto<sup>2</sup>, R. Aogaki<sup>3</sup>, K. Takahashi<sup>1</sup>

<sup>1</sup>*Tohoku University*, <sup>2</sup>*SAITEC*, <sup>3</sup>*Polytechnical University*

16:50-17:10 **Electrodeposition of Doped ZnO under a Constant Magnetic Field**

M. Stübner, J.P. Chopart, A.L. Daltin

*URCA*

17:10-17:30 **Optimization Conditions for the Electro-deposition of Thin ZnTe Film and Effect of Magnetic Field**

T. Kozuka, K. Sameshima, Y. Heguri

*Kumamoto University*

17:30-17:50 **Contribution of the Electro-Vortex Flow in Transport of Ions in an Electrolyte**

E. Karimi-Sibaki, A. Kharicha, M. Wu, J. Bohacek, A. Ludwig

*Montanuniversitaet of Leoben*

## Tuesday October 16

### <Room 1 (Main Hall)> Plenary Lecture 3, 4

9:00-10:20 **Chair:** H. Harada

9:00-9:40 **Plenary 3**

**Overview of Electromagnetic Forces to Control Flow During Continuous Casting of Steel**

B. G. Thomas, S. M Cho

*Colorado School of Mines*

9:40-10:20 **Plenary 4**

**Application of Static Magnetic Field to Casting of Steel**

Y. Miki, K. Furumai, T. Odagaki

*JFE Steel Corp.*

10:20-10:40 **Coffee Break**

### <Room 1 (Main Hall)> Electromagnetic Melting 2

10:40-12:10 **Chairs:** V. Bojarevics / H. Yasuda

10:40-11:10 **Keynote**

**Electromagnetic Particle Separation in the Cold Crucible Melting with Novel Type Bottom Pouring Nozzle**

V. Bojarevics, K. Pericleous

*University of Greenwich*

11:10-11:30 **Numerical Simulation of Surface Deformations in a Three-fluid Process Stirred by Low Frequency Magnetic Field**

R. Bourrou<sup>1,2</sup>, A. Gagnoud<sup>1</sup>, O. Budenkova<sup>1</sup>, P. Charvin<sup>2</sup>, C. Lafon<sup>2</sup>

<sup>1</sup>SIMaP, <sup>2</sup>CEA

11:30-11:50 **Vitrification in Cold Crucible Induction Melter: From Numerical Simulations to Industrial Operation**

E. Sauvage, P. Brun, A. Bonnetier

*CEA Marcoule*

11:50-12:10 **Simulation of Solidification Structure in the Magnetically Controlled Electroslag Remelting Process**

Y. B. Zhong, H. Wang, Q. Li, W.Q. Li, W.L. Ren, Z.S. Lei, Z.M. Ren

*Shanghai University*

### <Room 2 (Reception Hall)> Microwaves 1

10:40-12:20 **Chairs:** K. Kashimura / E. Baake

10:40-11:00 **The Electrical Permittivity of Metal Compounds for High Temperature Processing at 2.45GHz**

K. Kashimura

*Chubu University*

11:00-11:20 **Microwave Processing of Metallic Materials**

N. Yoshikawa

*Tohoku University*

11:20-11:40 **Coupling of Magnetite Particles with Microwaves at Temperatures Lower than the Curie Point**

A. Amini, K. Ohno, T. Maeda, K. Kunitomo

*Kyushu University*

- 11:40-12:00 **In-situ Spectroscopic Analysis of the Microwave Carbothermal Reduction of Iron Oxides**  
J. Fukushima, H. Takizawa  
*Tohoku Univ.*
- 12:00-12:20 **Fusion Solidification Treatment Technology of Combustion Ash by Microwave Heating**  
 T. Fuji<sup>1</sup>, K. Kashimura<sup>1</sup>, H. Tanaka<sup>2</sup>  
<sup>1</sup>Chubu University, <sup>2</sup>Chugoku High Pressure Concrete Industry Co., Ltd.

<b>&lt;Room 3 (301)&gt; Advanced Materials Processing 1</b>
---

- 10:40-12:10 **Chairs:** A. Bojarevičs / S. Shimasaki
- 10:40-11:10 **Keynote**  
**Permanent Magnet and AC System for Surface Wave Excitation to Enhance Mass Transfer**  
A. Bojarevičs, M. Milgrāvis, T. Beinerts, A. Dirba, V. Geža  
*University of Latvia*
- 11:10-11:30 **Numerical Study of Surface Waves Generated by Low Frequency EM Field for Silicon Refinement**  
V. Geza, J. Vencels, G. Zageris, S. Pavlovs  
*University of Latvia*
- 11:30-11:50 **Control of Crystal Orientation and Morphology of Tb<sub>0.3</sub>Dy<sub>0.7</sub>Fe<sub>1.9</sub> during Directional Solidification by High Magnetic Fields**  
T. Liu, D. Meng, X.Y. Guo, Q. Wang  
*Northeastern University*
- 11:50-12:10 **Tailoring the Microstructure and Properties of High-entropy Alloys Using High Magnetic Field**  
J. Wang<sup>1</sup>, J. Li<sup>1</sup>, E. Beaugnon<sup>2</sup>  
<sup>1</sup>Northwestern Polytechnical University, <sup>2</sup>Univ. Grenoble Alps
- 12:20-14:10 **Lunch**

<b>&lt;Room 1 (Main Hall)&gt; Solidification, Crystal Growth 2</b>
--

- 14:10-16:20 **Chairs:** N. Okada / J. Wang
- 14:10-14:40 **Keynote**  
**Development of EMBR/EMS Multifunction Mold**  
N. Okada, M. Kawamoto, S. Ohga  
*Nippon Steel & Sumitomo Metal Corporation*
- 14:40-15:00 **Magneto Fluid Dynamics Analysis of Continuous Casting Practices under Magnetic Fields through Numerical Modelling**  
P. Nazem Jalali<sup>1,2</sup>, E. Abiona<sup>3</sup>, P. E. Ramirez Lopez<sup>1</sup>, H. Yang<sup>3</sup>, P. Jönsson<sup>2</sup>  
<sup>1</sup>Swerea MEFOS AB, <sup>2</sup>KTH University, <sup>3</sup>ABB AB
- 15:00-15:20 **Experimental Modelling of Continuous Casting of Steel in Slab Moulds Using Low Melting Liquid Metals**  
K. Timmel, T. Wondrak, S. Eckert  
*HZDR*
- 15:20-15:40 **Numerical Simulation of Turbulent Steel CEM® Mold under High Mass Flow Condition**  
J.Y. Hwang<sup>1</sup>, M.J. Cho<sup>1</sup>, B.G. Thomas<sup>2</sup>, S.M. Cho<sup>2</sup>  
<sup>1</sup>POSCO, <sup>2</sup>Colorado School of Mines
- 15:40-16:00 **Analysis of the Influence of Vertical EMBR on Steel/Slag Interface in Continuous Casting**  
L. Xu<sup>1</sup>, E.G. Wang<sup>1</sup>, C. Karcher<sup>2</sup>, A.Y. Deng<sup>1</sup>, X.J. Xu<sup>1</sup>  
<sup>1</sup>Northeastern University, <sup>2</sup>Technische Universität Ilmenau

16:00-16:20 **Two Paradigms on Study Slab Continuous Casting Process with Mold Electromagnetic Stirring**  
Z. Lei<sup>1</sup>, B. Li<sup>1</sup>, Y. Zhou<sup>2</sup>, X. Wu<sup>1</sup>, Y. Zhong<sup>1</sup>, Z. Ren<sup>1</sup>  
<sup>1</sup>Shanghai University, <sup>2</sup>Baosteel

16:20-16:40 **Coffee Break**

<b>&lt;Room 1 (Main Hall)&gt; Solidification, Crystal Growth 3</b>
--

16:40-18:30 **Chairs:** L. Nastac / K. Iwai

16:40-17:10 **Keynote**

**Resonant Pulsed Electromagnetic Stirring of Melt for Effective Grain Fragmentation**

D. Köppen<sup>1,2</sup>, E. Baake<sup>1</sup>, G. Gerstein<sup>1</sup>, G. Mrówka-Nowotnik<sup>3</sup>, G. Jarczyk<sup>4</sup>

<sup>1</sup>Leibniz University Hannover, <sup>2</sup>Kazan State Power Engineering University,

<sup>3</sup>Rzeszów University of Technology, <sup>4</sup>Engineering Consulting

17:10-17:30 **Permanent Magnet Dipole Stirrer for Aluminium Furnaces**

T. Beinerts, A. Bojarevičs, R. Baranovskis, M. Milgrāvis, I. Kaldre

University of Latvia

17:30-17:50 **An Experimental and Modeling Study of Al-based Nanocomposites Fabricated by Ultrasonic Cavitation and Solidification Processing**

L. Nastac, X. Yang

The University of Alabama

17:50-18:10 **Effect of Time-modulated Magnetic Fields on the Solidification Structure and Extrusion Properties of Wrought Aluminum Alloys**

D. Rübiger<sup>1</sup>, C. Resewski<sup>1,2</sup>, S. Müller<sup>2</sup>, B. Willers<sup>1</sup>, W. Reimers<sup>2</sup>, S. Eckert<sup>1</sup>

<sup>1</sup>Helmholtz-Zentrum Dresden-Rossendorf, <sup>2</sup>Technical University Berlin

18:10-18:30 **Inclusion Removal from Molten Steel Using Electromagnetic Vibrating Force**

A. Maruyama, K. Iwai

Hokkaido University

<b>&lt;Room 2 (Reception Hall)&gt; Fundamental of EPM 1</b>
---

14:10-15:20 **Chairs:** A. Kharicha / I. Mogi

14:10-14:40 **Keynote**

**Electro-vortical MHD Interface Instabilities**

A. Kharicha, E. Karimi-Sibaki, M. Wu, A. Ludwig

Montanuniversitaet Leoben

14:40-15:00 **Relevance of Low-Rm MHD for Surface Viscosimetry of Liquid Metals**

K. Patouillet<sup>1,2</sup>, L. Davoust<sup>1</sup>, O. Doche<sup>1</sup>, V. Ebrahimian<sup>2</sup>

<sup>1</sup>SIMaP/EPM, <sup>2</sup>Montupet

15:00-15:20 **On the Melt Flow Peculiarities in Non-ideal Rotating Magnetic Field**

A. Azulay, B. Mikhailovich, A. Levy, A. Yakhot

Ben-Gurion University of the Negev

16:20-16:40 **Coffee Break**

## <Room 2 (Reception Hall)> Fundamental of EPM 2

- 16:40-18:30 **Chairs:** G. Berthiau / T. Tagawa
- 16:40-17:10 **Keynote**  
**Numerical and Experimental Study of Liquid Metal Stirring by Rotating Permanent Magnets**  
 V. Dzelme<sup>1</sup>, A. Jakovics<sup>1</sup>, J. Vencels<sup>1</sup>, D. Köppen<sup>2</sup>, E. Baake<sup>2</sup>  
<sup>1</sup>University of Latvia, <sup>2</sup>Leibniz University of Hannover
- 17:10-17:30 **3D Numerical Modeling for Inductive Processes**  
 A. Gagnoud, Y. Du Terrail-Couvat, O. Budenkova  
 Univ. Grenoble Alpes
- 17:30-17:50 **Numerical Modelling of Liquid Metal Electromagnetic Pump with Rotating Permanent Magnets**  
 V. Dzelme, A. Jakovics, I. Buceniks  
 University of Latvia
- 17:50-18:10 **Numerical Model of Dropping Evolution Behaviors during the Magnetically Controlled ESR Process**  
 H. Wang, Y.B. Zhong, Q. Li, W.Q. Li, W.L. Ren, Z.S. Lei, Z.M. Ren  
 Shanghai University
- 18:10-18:30 **Fast 3D Simulation of Various Applications of Induction Heating**  
 H.K. Bui, A. Ba, G. Berthiau, D. Trichet  
 University of Nantes

## <Room 3 (301)> Advanced Materials Processing 2

- 14:10-14:50 **Chairs:** T. Liu / S. Tsurekawa
- 14:10-14:30 **Tuning Size of Hollowed Co<sub>2</sub>P Nanoparticles through Application of High Magnetic Field**  
 X. Wang, C. Wu, K. Wang, W. Pei, Q. Wang  
 Northeastern University
- 14:30-14:50 **Diffusion in Copper/Cobalt System under High Magnetic Field**  
 Z. Zhang<sup>1,2</sup>, X. Zhao<sup>1</sup>, S. Tsurekawa<sup>2</sup>  
<sup>1</sup>Northeastern University, <sup>2</sup>Kumamoto University

## <Room 3 (301)> EM Processes 2

- 14:50-16:10 **Chairs:** T. Liu / S. Tsurekawa
- 14:50-15:10 **Magnetic Orientation Of h-BN and its Anisotropic Susceptibility**  
 I. Yamamoto, K. Nakada, K. Baba, T. Okabe, M. Tataru, Y. Chiba  
 Yokohama National University
- 15:10-15:30 **Removal of Scales from Boiler Feed Water in Thermal Power Plants Using Superconducting Magnetic Separation**  
 N. Hirota<sup>1</sup>, H. Okada<sup>1</sup>, F. Mishima<sup>2</sup>, S. Nishijima<sup>2</sup>, Y. Akiyama<sup>3</sup>, H. Matsuura<sup>4</sup>, S. Namba<sup>4</sup>, T. Sekine<sup>5</sup>  
<sup>1</sup>National Institute for Materials Science, <sup>2</sup>Fukui University of Technology, <sup>3</sup>Osaka Univ.,  
<sup>4</sup>Shikoku Research Institute Inc., <sup>5</sup>Ebara Industrial Cleaning Co. Ltd.
- 15:30-15:50 **Electromechanical Milling - Conception and Design of the Excitation System**  
 B. Halbedel  
 Technische Universität Ilmenau
- 15:50-16:10 **Static Magnetic Field has Impact on Solidification Structure via Additive Manufacturing**  
 J. Wang, Z. Ren  
 Shanghai University



## Wednesday October 17

### <Room 1 (Main Hall)> Plenary Lecture 5, 6

9:00-10:20 **Chair:** N. Hirota

9:00-9:40 **Plenary 5**  
**Influence of Electromagnetic Stirring Mode on Solidification Behaviour of Special Steel Strands**

E. Wang, Y. Xu, F. Wang  
*Northeastern University*

9:40-10:20 **Plenary 6**  
**Oscillating Electromagnetic Force Effect on Concentration Distribution near Liquid Solid Interface**

K. Iwai<sup>1</sup>, T. Yokota<sup>1</sup>, A. Maruyama<sup>1</sup>, T. Yamada<sup>2</sup>  
<sup>1</sup>*Hokkaido University*, <sup>2</sup>*Nagoya Municipal Industrial Research Institute*

10:20-10:40 **Coffee Break**

### <Room 1 (Main Hall)> Solidification, Crystal Growth 4

10:40-12:10 **Chairs:** K. Zaidat / H. Harada

10:40-11:10 **Keynote**  
**Experimental Investigation of the Effect of Travelling Magnetic Field on the CET in Sn-10wt.%Pb Alloy**

K. Zaidat<sup>1</sup>, I. Sari<sup>2</sup>, A. Boumaaza<sup>2</sup>, A. Abdelhakem<sup>2</sup>, L. Hachani<sup>2</sup>, Y. Fautrelle<sup>1</sup>  
<sup>1</sup>*Laboratoire SIMaP-EPM*, <sup>2</sup>*Laboratoire Physique des matériaux*

11:10-11:30 **Synchrotron X-ray Studies of the Evolution of Solidification Microstructures Under Pulse Magnetic Field**

J. Mi, W. Du  
*University of Hull*

11:30-11:50 **In-situ Observation of Dendritic Growth under the Influence of Electromagnetically Driven Flow**

N. Shevchenko, O. Keplinger, S. Eckert  
*Helmholtz-Zentrum Dresden-Rossendorf (HZDR)*

11:50-12:10 **Investigation of Si Content on the Grain Refinement of Al-Si Alloy under Pulsed Magnetic Field**

J.C. Jie, S.P. Yue, Z.L. Zheng, Z.K. Guo, T.J. Li  
*Dalian University of Technology*

### <Room 2 (Reception Hall)> Induction Heating 1

10:40-12:10 **Chairs:** B. Nacke / J. Fukushima

10:40-11:10 **Keynote**  
**Potentials of Single Stage Induction Heating for Press Hardening of Steel Blanks**

B. Nacke, A. Dietrich  
*Leibniz University Hannover*

11:10-11:30 **Induction Preheating For The Submerged Arc Welded Steel Tube Production**

C. Cincunegui, P. Marino  
*Tenaris R&D Center*

11:30-11:50 **Simulating the Magnetic Field/Transfer Phenomenon of the Tundish with Channel Type Inducing Heating**

B. Yang, A. Y. Deng, E. G. Wang  
Northeastern University

11:50-12:10 **Recent Progress of Induction Heating Technology in Baosteel**

C. Y. Wu, X. L. Jin, Y. M. Zhou  
Baoshan Iron&Steel Co. Ltd.

### <Room 3 (301)> **Low Electrical Conductivity Liquid Processing 1**

10:40-11:10 **Chairs:** N. Yoshikawa / S. Rivoirard

10:40-11:10 **Keynote**

**Fundamental Studies on Induction Heating and Stirring of Non-Metallic Molten Fluid**

N. Yoshikawa, K. Watanabe, T. Igarashi, S. Komarov  
Tohoku University

### <Room 3 (301)> **Recycling 1**

11:10-12:00 **Chairs:** N. Yoshikawa / S. Rivoirard

11:10-11:40 **Keynote**

**Recycling and Valorisation of Rare Earth-based Magnets**

J.B. Denis<sup>1,2</sup>, F. Mandil<sup>1,2</sup>, S. Rivoirard<sup>1,2</sup>  
<sup>1</sup>Univ. Grenoble Alpes, <sup>2</sup>CNRS

11:40-12:00 **Separation of Steelmaking Slag with Mechanical Stirring by Fluctuated Magnetic Field**

Y. Takaki, M. Sasaki, K. Ishida, Y. Nishina, J. Yotsuji, J. Tateno  
JFE Steel Corporation

12:10-14:00 **Lunch**

### <Room 1 (Main Hall)> **Solidification, Crystal Growth 5**

14:00-15:50 **Chairs:** J. Park / S. Shimasaki

14:00-14:30 **Keynote**

**Continuous Casting of Hypereutectic Aluminum-Silicon Alloy Billets Using Electromagnetic Stirring Technique**

J. Park<sup>1</sup>, M. G. Kim<sup>1</sup>, J. H. Kim<sup>1</sup>, J. Shin<sup>2</sup>, K. Lee<sup>3</sup>  
<sup>1</sup>Research Institute of Industrial Science and Technology, <sup>2</sup>Korea Automotive Technology Institute,  
<sup>3</sup>Inha University

14:30-14:50 **Direct Chill Casting with Reversing Rotational Electromagnetic Field**

S. Shimasaki<sup>1</sup>, A. Minagawa<sup>2</sup>  
<sup>1</sup>National Institute of Technology, Kagawa College, <sup>2</sup>UACJ Corporation

14:50-15:10 **Microstructure and Properties of Al-Si Alloys under Intermediate Frequency Electromagnetic Field**

Y. Zhang<sup>1</sup>, Y. Fu<sup>2</sup>, G. Guo<sup>3</sup>, J. Jie<sup>1</sup>, T. Li<sup>1</sup>  
<sup>1</sup>Dalian University of Technology, <sup>2</sup>Bohai University,  
<sup>3</sup>State Key Laboratory of Metal Material for Marine Equipment and Application

- 15:10-15:30 **Effect of High Static Magnetic Field on the Microstructure and Compression Properties of Al-Cu Alloy**  
T.X. Zheng<sup>1</sup>, B.F. Zhou<sup>1</sup>, J. Wang<sup>1</sup>, S.S. Shuai<sup>1</sup>, Y.B. Zhong<sup>1</sup>, Z.M. Ren<sup>1</sup>, E. Beaugnon<sup>2</sup>, F. Debray<sup>2</sup>  
<sup>1</sup>Shanghai University, <sup>2</sup>LNCMI, CNRS/UJF/INSA/UPS
- 15:30-15:50 **Contactless Electromagnetic Method for Aluminium Degassing**  
I. Kaldre, A. Bojarevics, T. Beinerts, R. Baranovskis, R. Nikoluskins, M. Milgrāvis, M. Kalvāns  
 University of Latvia

### <Room 2 (Reception Hall)> EM Treatment 1

- 14:00-15:20 **Chairs:** J. Barglik / N. Yoshikawa
- 14:00-14:20 **Effect of Magnetically Water on Hardenability of SCM440 Steels**  
N. Mahathaninwong, S. Wisutmethangoon, T. Chucheep, S. Janudom  
 Prince of Songkla University
- 14:20-14:40 **Induction Contour Hardening of Gear Wheels Made of Steel 300M**  
J. Barglik  
 Silesian University of Technology
- 14:40-15:00 **Nuclear Waste Treatment by Induction Heating and Stirring of a Metal/Glass Bath: The PIVIC Process**  
P. Charvin, F. Lemont, A. Russello  
 CEA
- 15:00-15:20 **Induction Heat Treatment of Large Diameter Pipes and Coils**  
V. Demidovich<sup>1</sup>, V. Andrushkevich<sup>2</sup>, Yu. Perevalov<sup>2</sup>  
<sup>1</sup>St.Petersburg Electrotechnical University (LETI),  
<sup>2</sup>Russian Technologies of Induction Heating (RTIH) Ltd.

### <Room 2 (Reception Hall)> Advanced Materials Processing 3

- 15:20-16:20 **Chairs:** Y.B. Zhong / T. Ando
- 15:20-15:40 **Design of an One-sided Transverse Flux Induction Coil by Using a Numerical Optimization Algorithm**  
M. Schulze<sup>1</sup>, B. Nacke<sup>1,2</sup>, A. Nikanorov<sup>1,2</sup>  
<sup>1</sup>Leibniz University Hannover, <sup>2</sup>St. Petersburg Electrotechnical University
- 15:40-16:00 **Effect of Rare Earth Y on Properties of Cu Cr Zr Alloy**  
Y.B. Zhong, D.S. Zhu  
 Shanghai University
- 16:00-16:20 **Potential of Open Source Simulation Tools for Induction Heating**  
V. Geza<sup>1</sup>, M. Scepankis<sup>2</sup>, R. Vilums<sup>2</sup>, A. Eimuss<sup>2</sup>  
<sup>1</sup>University of Latvia, <sup>2</sup>CENOS LLC

### <Room 3 (301)> Fundamental of EPM 3

- 14:00-15:50 **Chairs:** S. Eckert / Y. Miki
- 14:00-14:30 **Keynote**  
**Flow Structures in Liquid Metal Rayleigh-Benard Convection under the Influence of DC Magnetic Fields**  
T. Vogt<sup>1</sup>, F. Schindler<sup>1</sup>, F. Stefani<sup>1</sup>, T. Zürner<sup>2</sup>, J. Schumacher<sup>2</sup>, Y. Tasaka<sup>3</sup>, T. Yanagisawa<sup>4</sup>, S. Eckert<sup>1</sup>  
<sup>1</sup>Helmholtz-Zentrum Dresden – Rossendorf (HZDR), <sup>2</sup>Technical University Ilmenau,  
<sup>3</sup>Hokkaido University, <sup>4</sup>Japan Agency for Marine-Earth Science and Technology (JAMSTEC)

- 14:30-14:50 **Wetting Behaviour of Liquid Metals on Polycrystalline Alumina Substrates under High Magnetic Fields**  
Y. Xiao, T. Liu, Z. Lu, Q. Wang  
*Northeastern University*
- 14:50-15:10 **Simulation of Electrically Induced Vortical Flows**  
V. Dzelme<sup>1</sup>, A. Jakovics<sup>1</sup>, A. Chudnovsky<sup>2</sup>, E. Baake<sup>3</sup>  
<sup>1</sup>University of Latvia, <sup>2</sup>BIS Global Ltd., <sup>3</sup>Leibniz University of Hannover
- 15:10-15:30 **Levitation Capability Improvement for Electromagnetic Levitation of Bulk Metallic Materials Using Optimized Structure Coil**  
X. Cai, H. P. Wang, P. Lü, B. Wei  
*Northwestern Polytechnical University*
- 15:30-15:50 **Experimental and Numerical Investigation on Particle-induced Liquid Metal Flow Using Lorentz Force Velocimetry**  
 Ch. Karcher, Z. Lyu, Th. Boeck, N. Tran, U. Lüdtkke  
*Technische Universität Ilmenau*

<b>&lt;Reception Hall B Foyer&gt;    Poster Session</b>
---

- 16:20-18:00
- 16:20-17:10 **Poster 1**  
**Hierarchical Optimization Approaches in Designing Surface Hardening Induction Systems**  
 M. Baldan<sup>1</sup>, A. Nikanorov<sup>1,2</sup>, B. Nacke<sup>1,2</sup>  
<sup>1</sup>Leibniz University Hannover, <sup>2</sup>St. Petersburg Electrotechnical University
- 17:10-18:00 **Poster 2**  
**Three-dimensional Numerical Computation of Gas-liquid Two-phase Flow under Pseudo Microgravity Environment Using a Superconducting Electromagnet**  
S. Kikuchi, T. Tagawa  
*Tokyo Metropolitan University*
- 16:20-17:10 **Poster 3**  
**Numerical Investigation of a Double Frequency Approach for Longitudinal HF Welding of Cladded Pipes**  
 W. Ebel<sup>1</sup>, M. Kroll<sup>2</sup>, E. Baake<sup>1</sup>, A. Nikanorov<sup>1</sup>  
<sup>1</sup>Leibniz Universität Hannover, <sup>2</sup>Technische Universität Chemnitz
- 17:10-18:00 **Poster 4**  
**Design Improvements for Increasing Lifetime of Single-shot Coils Applied at Rotating Workpieces**  
 S. Schubotz<sup>1</sup>, B. Nacke<sup>2</sup>  
<sup>1</sup>EFD Induction GmbH, <sup>2</sup>Leibniz Universität Hannover
- 16:20-17:10 **Poster 5**  
**Effect of Electromagnetic Field on Microstructure and Properties of Cu-Cr-Co-Si Alloy**  
 X. Sun, J. Jie, T. Li  
*Dalian University of Technology*
- 17:10-18:00 **Poster 6**  
**Nondestructive Testing of the Interfaces of Two Electrically Conducting Fluids**  
X.J. Xu<sup>1</sup>, C. Karcher<sup>2</sup>, J. M. Otterbach<sup>2</sup>, E.G. Wang<sup>1</sup>  
<sup>1</sup>Northeastern University, <sup>2</sup>Technische Universität Ilmenau
- 16:20-17:10 **Poster 7**  
**Investigation of Refining Mechanism in Pure Al under Pulsed Magnetic Field**  
S.P. Yue, Z.L. Zheng, J.C. Jie, Z.K. Guo, T.J. Li  
*Dalian University of Technology*

- 17:10-18:00 **Poster 8**  
**Microstructure Evolution of Cu-15Ni-8Sn Alloy Prepared by Vertical Semi-continuous Casting with EMS**  
Z. Guo<sup>1</sup>, J. Jie<sup>1</sup>, S. Yue<sup>1</sup>, T. Li<sup>1</sup>, Q. Guo<sup>2</sup>  
<sup>1</sup>*Dalian University of Technology*,  
<sup>2</sup>*State Key Laboratory of Metal Material for Marine Equipment and Application*
- 16:20-17:10 **Poster 9**  
**Influence of Magnetic Field on Surface Self-diffusion and Grain Boundary Energy in Pure Iron**  
C. Sakaguchi, T. Yamamuro, S. Tsurekawa  
*Kumamoto University*
- 17:10-18:00 **Poster 10**  
**High-Density  $\beta$ -FeSi<sub>2</sub> Crystals with 3D Alignment Fabricated by an Oscillating Magnetic Field**  
K. Ono, A. Hashimoto, K. Kurokawa, N. Nakatsuka, K. Morishita, H. Yasuda  
*Kyoto University*
- 16:20-17:10 **Poster 11**  
**Mono-dispersed Droplets Formation from Capillary Jet of Liquid Metal by Applying an Electric Field**  
Y. Hamaguchi<sup>1</sup>, K. Matsumoto<sup>1,2</sup>, S. Shimasaki<sup>1</sup>, S. Taniguchi<sup>3</sup>  
<sup>1</sup>*National Institute of Technology, Kagawa College*, <sup>2</sup>*Tsukuba University*, <sup>3</sup>*Tohoku University*
- 17:10-18:00 **Poster 12**  
**Structure Formation of Magnetic Particles under Magnetic Fields toward Anisotropic Materials**  
T. Ando<sup>1</sup>, D. Katayama<sup>1</sup>, N. Hirota<sup>2</sup>, O. Koike<sup>3</sup>, R. Tatsumi<sup>4</sup>, M. Yamato<sup>5</sup>  
<sup>1</sup>*Nihon University*, <sup>2</sup>*National Institute for Materials Science*, <sup>3</sup>*Products Innovation Association*,  
<sup>4</sup>*The University of Tokyo*, <sup>5</sup>*Tokyo Metropolitan University*
- 16:20-17:10 **Poster 13**  
**Structural Transformation of Bilayer Ferro-foams Caused by Homogeneous Static Magnetic Field**  
W. Chen, H.-Q. Dong, S.-B. Wang, Z.-S. Lei, J.-H. Guo  
*Shanghai University*
- 17:10-18:00 **Poster 14**  
**Multi-frequency Inductive System for Magnesium Level Detection in a Titanium Reduction Reactor**  
N. Krauter<sup>1</sup>, F. Stefani<sup>1</sup>, T. Gundrum<sup>1</sup>, T. Wondrak<sup>1</sup>, P. Frick<sup>2</sup>, R. Khalilov<sup>2</sup>  
<sup>1</sup>*Helmholtz Zentrum Dresden Rossendorf*, <sup>2</sup>*Institute of Continuous Media Mechanics*
- 16:20-17:10 **Poster 15**  
**MHD-equipment and Technologies of Semi-continuous Billet Casting of High-strength Al-alloys**  
M.A. Slazhniev, K.H. Kim, H.S. Sim, S.W. Kim, W.J. Kim  
*Dong San Tech. Co., Ltd.*
- 17:10-18:00 **Poster 16**  
**On the Macro Distribution of Fe and Cu Phases in Fe-50mass% Cu Alloys Solidified in a Static Magnetic Field**  
M. Li, T. Tamura  
*The National Institute of Advanced Industrial Science and Technology (AIST)*