

## ISMB15 Time Table

### Wednesday, Aug. 3

9:30	16:30	City Tour
17:30	20:00	Registration@Mojiko Hotel
18:00	20:00	Welcome Reception@Mojiko Hotel

### Thursday, Aug. 4

8:00	18:00	Registration			
		Room A (2F)	Room B (4F)	Room C (4F)	Room D (4F)
8:30	8:40	Opening			Exhibition
8:40	8:50	Break 10 min			
8:50	10:10	Applications I	Devices	SBMs I	
10:10	10:40	Coffee Break 30 min			
10:40	12:00	Applications II	Control I	SBMs II	
12:00	13:00	Lunchtime Presentation (12:30 - 12:50) 1) Tianjin Emaging Technology 2) SINKAWA Electric		Lunch 60 min	
13:00	13:40	Keynote I			
13:40	14:00	Take Photo & Break 20 min			
14:00	15:40	Applications III	Control II	SBMs III	
15:40	16:10	Coffee Break 30 min			
16:10	17:50	Design & Modeling I	Control III	SBMs IV	
17:30	22:00	Dinner for All in Mojiko Area			
18:30		Meeting for International Advisory Committee Members (by Bus)			

### Friday, Aug. 5

8:00	12:00	Registration			
		Room A (2F)	Room B (4F)	Room C (4F)	Room D (4F)
8:30	9:30	Design & Modeling II	Self-Sensing I	SBMs V	Exhibition
9:30	9:40	Break 10 min			
9:40	10:40	Design & Modeling III	Self-Sensing II	SBMs VI	
10:40	11:10	Coffee Break 30 min			
11:10	11:50	Keynote II			
12:05	17:15	Technical Tour			
18:00	20:00	Banquet@Mojiko Hotel (2F)			

### Saturday, Aug. 6

8:00	12:00	Registration			
		Room A (2F)	Room B (4F)	Room C (4F)	Room D (4F)
8:30	9:50	Design & Modeling IV	Control IV	SBMs VII	Exhibition
9:50	10:20	Coffee Break 30 min			
10:20	12:00	Design & Modeling V	Control V	SBMs VIII, PMBs I	
12:00	13:00	Lunch 60 min			
13:00	13:40	Keynote III			
13:40	13:50	Break 10 min			
13:50	15:10	Backup Bearings I	Control VI	PMBs II	
15:10	15:40	Coffee Break 30 min			
15:40	17:20	Backup Bearings II	Control VII	PMBs III	
17:20	18:30	Farewell Party@Mojiko Hotel			
18:30	21:00	Summer Festival @Nishikokura (by JR Train)			

## KEYNOTES

### Keynote Address I

Time/Room : Thursday, Aug. 4, 13:00 - 13:40 / Room A (2F)

Chairs: Hannes Bleuler, Richard M. Stephan, Haruhiko Suzuki

#### **Related technologies of magnetic bearings and their applications**

*Toshiro Higuchi, University of Tokyo (emeritus professor), Ritsumeikan University (visiting professor), Japan*

Since about 35 years ago, I have been involved in various kinds of research works about magnetic bearings and their related technologies. The belief summary is presented in this speech. The subjects are as follows. Estimation and compensation of unbalance; Periodic learning control; Clean robot with magnetic bearing joints; Magnetically Suspended Stepping Motors; Magnetic supported intelligent hand for automated precise assembly; Magnetic levitation by pinning effect of HTS and soft magnetic material; Electrostatic suspension and drive of thin glass sheet and wafer; Magnetic suspension by motion control of magnet; Magnetic suspension by composite of magnetostrictive and piezoelectric materials; Non-contact handling by tilt control and automatic object release.

### Keynote Address II

Time/Room : Friday, Aug. 5, 11:10 - 11:50 / Room A (2F)

Chairs: Wofgang Amrhein, Mimpei Morishita

#### **The Short History of the Superconducting Maglev - Changes in Null flux circuit and Pole pitch -**

*Junichi Kitano, Maglev Systems Development Division, Central Japan Railway Company, Japan*

The first-ever concept of the Superconducting Maglev train was proposed by Dr. Powell and Dr. Danby in 1966. After the half century development, the basic technologies were established and daily operation of 500km/h by a 7-car train set continues in the Yamanashi Test Line. The world speed record of 603km/h was established in April 2015 and the cumulative distance traveled reached 1,500,000km at the end of March 2016. Also, the Chuo Shinkansen connecting Tokyo and Nagoya in 40 minutes, is now under construction. In this paper, a brief overview of changes in a Null flux circuit and a pole pitch of the Miyazaki Test Track and the Yamanashi Test Line is presented.

### Keynote Address III

Time/Room : Saturday, Aug. 6, 13:00 - 13:40 / Room A (2F)

Chairs: Lichuan Li, Toru Masuzawa

#### **Application of Flywheel Energy Storage Systems as an Industrial Product**

*Larry Hawkins, Director of Technology for Magnetic Bearings and Co-Founder, Calnetix Technologies, USA*

Flywheel Energy Storage Systems (FESS) have now progressed from a promising technology to the core element of true commercial products. FESS are now part of the critical power supply in many diverse applications – from data centers to health care facilities, and from the gaming industry to broadcast studios. Flywheel systems are improving energy demand efficiency in mobile cranes and in metro rail stations. Advances in magnetic bearings and in efficient power conversions devices have played key roles. This talk discusses several aspects of industrial flywheel systems – the basics of flywheel energy storage, key technologies, how it is applied, and how flywheels tradeoff against competing technologies. Key trends and requirements in the common application areas are also discussed.

Thursday, Aug. 4

Session	T1A	Applications I	T1B	Devices	T1C	SBMs I
Time/Room		8:50 - 10:10 / Room A (2F)		8:50 - 10:10 / Room B (4F)		8:50 - 10:10 / Room C (4F)
Session Chairs		Bruno Dehez, Frank Worlitz		Hirochika Ueyama, Matthias Hofer		Junichi Asama, Satoshi Ueno
8:50 9:10	T1A1	<b>The development of the flywheel energy storage system applying the high temperature superconducting magnetic bearing - The examination of a demonstration machine by having it charged/discharged with solar photovoltaic power -</b>	T1B1	<b>Theoretical basics and closed loop control design of stray-flux-based measurement systems for magnetic bearings</b>	T1C1	<b>20 Years Bearingless Slice Motor - its Developments and Applications</b>
	10077	<i>*Motohiko Sugino, Ken Nagashima, Masafumi Ogata, Tomohisa Yamashita, Hitoshi Matsue, Yoshiki Miyazaki (Railway Technical Research Institute), Shinichi Horiuchi (Yamanashi Pref. Gov.), Japan</i>	10012	<i>*Johannes Rudolph, Ralf Werner (Chemnitz University of Technology), Germany</i>	10125	<i>*Wolfgang Gruber (Johannes Kepler University Linz), Siegfried Silber (Linz Center of Mechatronics), Austria</i>
9:10 9:30	T1A2	<b>The development of the flywheel energy storage system applying the high temperature superconducting magnetic bearing (second report) - The development and the performance evaluation examination of the SMB for the FESS demonstration machine -</b>	T1B2	<b>Estimation of Magnetic Center Location in Radial Active Magnetic Bearings Through a Pull Test</b>	T1C2	<b>Impact of Inclination of Teeth for Bearingless Motor with Non-contact Power Supply</b>
	10145	<i>Motohiko Sugino, *Yoshiki Miyazaki, Ken Nagashima, Masafumi Ogata, Tomohisa Yamashita, Hitoshi Matsue (Railway Technical Research Institute), Taro Matsuoka, Kengo Nakao (Furukawa Electric), Japan</i>	10104	<i>Sunggyu Nam, *Myounggyu D. Noh, Young-Woo Park (Chungnam National University), Nam-Soo Lee, Jinhee Jeong (LG Electronics), South Korea</i>	10160	<i>*Yohei Machida, Koichi Oka (Kochi University of Technology), Japan</i>
9:30 9:50	T1A3	<b>High temperature active magnetic bearings in industrial steam turbines</b>	T1B3	<b>Automated Design of AMB Rotor Systems with Standard Drive, Control Software and Hardware Technologies</b>	T1C3	<b>Torque interaction of the drive and active radial magnetic bearing in an ultra-high speed spinning ball motor</b>
	10119	<i>*Stephan Duesterhaupt, Holger Neumann, Torsten Rottenbach, Christian Vanek, Frank Worlitz (Zittau/Gorlitz University of Applied Sciences), Germany</i>	10157	<i>*Rafal P. Jastrzebski, Teemu Sillanpaa, Pekko Jaatinen, Alexander Smirnov, Jouni Vuojolainen, Tuomo Lindh (Lappeenranta University of Technology), Antti Laiho (ABB, Oy Motors and Generators), Olli Pyrhonen (LUT), Finland</i>	10091	<i>*Marcel Schuck (Swiss Federal Institute of Technology, Zurich), Daniel Steinert (Levitronix), Johann Walter Kolar (ETH), Switzerland</i>
9:50 10:10	T1A4	<b>Thermal model for a low-speed flywheel in medium vacuum</b>	T1B4	<b>The Electro Magnetic Compatibility Analysis and Experiment of the electronic system in AMB</b>		
	10071	<i>*Virginie Kluykens, Maxence Van Beneden, Bruno Dehez (Universite Catholique de Louvain), Belgium</i>	10084	<i>*Yan Zhou, Ni Mo, Guojun Yang, Zhengang Shi, Lei Zhao (Tsinghua University), China</i>		

Thursday, Aug. 4

Session	T2A	Applications II	T2B	Control I	T2C	SBMs II
Time/Room		10:40 - 12:00 / Room A (2F)		10:40 - 12:00 / Room B (4F)		10:40 - 12:00 / Room C (4F)
Session Chairs		Richard Jayawant, Naohiko Takahashi		Ilmar Santos, Toru Watanabe		Wolfgang Gruber, Yohji Okada
10:40 11:00	T2A1	<b>Zero Power Levitation Control of a Magnetically Levitated Linear Slider Platform with Non-Contact Power Supply</b>	T2B1	<b>Design of Robust AMB Controllers for Rotors Subjected to Varying and Uncertain Seal Forces</b>	T2C1	<b>Efficiency of buried permanent magnet type 5kW and 50kW high-speed bearingless motors with 4-pole motor windings and 2-pole suspension windings</b>
	10164	<i>*Buddhika Imantha Annasiwaththa, Koichi Oka (Kochi University of Technology), Japan</i>	10048	<i>*Jonas Lauridsen, Ilmar Santos (Technical University of Denmark), Denmark</i>	10112	<i>*Rafal Piotr Jastrzebski, Pekko Jaatinen (Lappeenranta University of Technology), Akira Chiba (Tokyo Institute of Technology), Olli Pyrhonen (LUT), Finland</i>
11:00 11:20	T2A2	<b>Numerical and experimental assessment of a large industrial thrust bearing</b>	T2B2	<b>Experimental Verification of Adaptive Control in Active Magnetic Bearings</b>	T2C2	<b>Using feed-forward back propagation for Rotor Flux Estimation of a Bearingless Induction Motor applied in the Speed Vector Control</b>
	10013	<i>*Benjamin Defoy (GE Oil &amp; Gas), Xavier de Lepine, Lionel Broussard (GE Energy Power Conversion), Mohamed Osama (GE Global Research), France</i>	10094	<i>*Li Li, Stephan Duesterhaupt, Frank Worlitz (Zittau/Gorlitz University of Applied Sciences), Germany</i>	10054	<i>J. S. B. Lopes, J. D. Fernandes, F. E. C Souza, L. P. Santos, J. A. de Paiva (Federal Institute of Education, Science and Technology of Rio G. do Norte), *Andres Ortiz Salazar (Federal University of Rio Grande do Norte), Brazil</i>
11:20 11:40	T2A3	<b>Design of a Mobile Flywheel Energy Storage driven by a Switched Reluctance Machine</b>	T2B3	<b>Improvement of Active Magnetic Bearing system using Jerk Feedback Controller for an Elastic Rotor</b>	T2C3	<b>Unbalance Compensation for Lorentz-force-type Self-Bearing Motor</b>
	10016	<i>*Fabian Lorenz, Ralf Werner (Chemnitz University of Technology), Germany</i>	10047	<i>*Hirokazu Tomono, Hiroyuki Fujisaki, Toru Watanabe (Nihon University), Kazuto Seto (Seto-Engineering Office), Japan</i>	10137	<i>*Satoshi Ueno, Ryosuke Otani, Changan Jiang (Ritsumeikan University), Japan</i>
11:40 12:00	T2A4	<b>Design and Qualification Testing of Active Magnetic Bearings for High-Temperature Gas-Cooled Reactors</b>	T2B4	<b>Characteristic Model Based All-Coefficient Adaptive Control of a High-Speed Desorption Pump Supported by AMBs</b>	T2C4	<b>Evaluation of Motor Losses and Efficiency in a d-q Axis Current Control Bearingless Motor</b>
	10076	<i>*Zenglin Guo (Waukesha Magnetic Bearings), Guohui Zhou (Shanghai Blower Works), Richard R. Shultz (Waukesha Magnetic Bearings), Minlong Qian (Shanghai Blower Works), Liang Zhu (Tsinghua University), China</i>	10004	<i>*Long Di (University of Virginia), Chao Yun Chen, Chung Hsien Lin (Industrial Technology Research Institute), Zongli Lin (UVA), USA</i>	10165	<i>*Masahide Ooshima, Yuto Gomi (Tokyo University of Science, Suwa), Japan</i>

Thursday, Aug. 4

Session	T3A	Applications III	T3B	Control II	T3C	SBMs III
Time/Room		14:00 - 15:40 / Room A (2F)		14:00 - 15:40 / Room B (4F)		14:00 - 15:40 / Room C (4F)
Session Chairs		Zenglin Guo, Virginie Kluyskens		Wataru Hijikata, Kai Zhang		Akira Chiba, Changan Jiang
14:00 14:20	T3A1	<b>Design and Experiment of 300 HP Class Turbo Compressor with Hybrid Magnetic Bearings</b>	T3B1	<b>Stabilization of Self-excited Vibration in Rotor-oil Film Bearing System by Utilizing Radial Magnetic Bearing</b>	T3C1	<b>Automated parameter identification platform for magnetic levitation systems: case bearingless machine</b>
	10009	<i>*Cheol Hoon Park, Jun Young Park (Korea Institute of Machinery and Materials), South Korea</i>	10096	<i>Wataru Tsunoda, Wataru Hijikata, *Tadahiko Shinshi (Tokyo Institute of Technology), Hiroyuki Fujiwara, Osami Matsushita (National Defense Academy), Japan</i>	10041	<i>*Pekko Jaatinen, Teemu Sillanpaa, Rafal P. Jastrzebski, Eerik Sikanen, Olli Pyrhonen (Lappeenranta University of Technology), Finland</i>
14:20 14:40	T3A2	<b>Design and commissioning of a 3.3 MW motor-driven compressor fully supported on active magnetic bearings</b>	T3B2	<b>Characteristic quantities of active magnetic bearings</b>	T3C2	<b>Basic Calculation of Axial Force and Torque with Permeance Method in One-Axis Actively Positioned Single-Drive Bearingless Motor.</b>
	10043	<i>*Richard Jayawant, Andrea Masala (Waukesha Magnetic Bearings), UK</i>	10154	<i>*Gerald Jungmayr, Edmund Marth (Johannes Kepler University Linz), Robert Santner (Linz Center of Mechatronics), Wolfgang Amrhein (JKU Linz), Austria</i>	10113	<i>*Itsuki Shimura, Hiroya Sugimoto, Akira Chiba (Tokyo Institute of Technology), Japan</i>
14:40 15:00	T3A3	<b>Commissioning of Off-Shore Gas Compressor with 9-Axes Magnetic Bearing System: Controller Design</b>	T3B3	<b>Fractional Order Control of Rotor Suspension by Active Magnetic Bearings</b>	T3C3	<b>Control of a single parallel winding bearingless machine</b>
	10129	<i>*Beat Aeschlimann, Michael Hubatka, Michael Ernst Peter, Robert Stettler, Reza Housseini (Mecos AG), Switzerland</i>	10083	<i>*Parinya Anantachaisilp (Royal Thai Air Force Academy), Zongli Lin (University of Virginia), Thailand</i>	10075	<i>*Nicolas Schneider (University of Nottingham), Puvan Arumugam (Force Engineering), Herve Morvan, Seamus Garvey (University of Nottingham), Tahar Hamiti (VEDECOM), UK</i>
15:00 15:20	T3A4	<b>Initial Levitation Testing and Design of Magnetic Bearing System for High Speed Turbo-Aerator</b>	T3B4	<b>Robust controller design for AMB levitation recovery</b>	T3C4	<b>Modelling and Control Design Simulations of Permanent Magnet Flux-Switching Linear Bearingless Motor</b>
	10134	<i>Simon Mushi, Brad Nichols, Tim Dimond, *Paul Allaire, Jianming Cao (Rotor Bearing Solutions International), Richard Newark, Nigel Lloyd, Nick Schulze, Brad Billow, Farshad Daneshvar, Omar Alshahrani (Kinetic Traction Systems), USA</i>	10080	<i>*Alexander H. Pesch (Hofstra University), Jerzy T. Sawicki (Cleveland State University), USA</i>	10072	<i>*Rafal Piotr Jastrzebski, Pekko Jaatinen, Olli Pyrhonen (Lappeenranta University of Technology), Finland</i>
15:20 15:40	T3A5	<b>Design of Active Magnetic Radial and Thrust Bearings for High Speed Turbo Aerator</b>	T3B5	<b>Robust Adaptive Control of Permanent Magnetic Suspension System Using Variable Flux Path Control Method</b>	T3C5	<b>Development of New Propulsion System for Magnetically Levitated Vehicles</b>
	10135	<i>*Paul Allaire, Jianming Cao, Tim Dimond, Simon Mushi, Saeid Dousti (Rotor Bearing Solutions International), Richard Newark, Nigel Lloyd, Omar Alshahrani, Farshad Daneshvar (Kinetic Traction Systems), USA</i>	10121	<i>*Feng Sun, Pengpeng Xia, Xingwei Sun, He Lu (Shenyang University of Technology), Koichi Oka (Kochi University of Technology), China</i>	10008	<i>*Toshio Kakinoki, Hitoshi Yamaguchi, Tomoaki Murakami, Eiichi Mukai, Hiroyuki Nishi (Sojo University), Japan</i>

Thursday, Aug. 4

Session	T4A	Design & Modeling I	T4B	Control III	T4C	SBMs IV
Time/Room		16:10 - 17:50 / Room A (2F)		16:10 - 17:50 / Room B (4F)		16:10 - 17:30 / Room C (4F)
Session Chairs		Beat Aeschlimann, Koichi Oka		Parinya Anantachaisilp, Alexander Hans Pesch		Masahide Ooshima, Andres Ortiz Salazar
16:10 16:30	T4A1	<b>Laboratory Tests on an Interconnected Four Poles Magnetic Bearing</b>	T4B1	<b>A study on zero-bias simple adaptive control AMB system</b>	T4C1	<b>Simplified Configuration of a Two-DOF Actively Controlled Bearingless Motor Using Two H-Bridges</b>
	10074	<i>Domingos F. B. David, Jose A. Santisteban (Fluminense Federal University), *Afonso Celso D. N. Gomes (Federal University of Rio de Janeiro), Brazil</i>	10111	<i>*Dong Liang, Daisuku Ozaki, Astushi Kubo, Ryouichi Takahata (JTEKT), Kenzo Nonami (Chiba University), Japan</i>	10139	<i>*Junichi Asama, Kenta Sasaki, Takaaki Oiwa (Shizuoka University), Akira Chiba (Tokyo Institute of Technology), Japan</i>
16:30 16:50	T4A2	<b>Thermal Limit Analysis of Radial AMB by Using Finite Difference Method</b>	T4B2	<b>Analytical Asymmetric Air Gap Model for Active Magnetic Thrust Bearings of Mixed Materials Including Eddy Currents</b>	T4C2	<b>Modeling of a Single Point Suspended Electromagnetic Suspension Carrier System - Study on Rolling Motion -</b>
	10089	<i>*Chi Ting Yeh, Chung Hsien Lin (Industrial Technology Research Institute), Taiwan</i>	10017	<i>*Robert Seifert, Wilfried Hofmann (Dresden University of Technology), Germany</i>	10156	<i>*Shogo Hida, Mimpei Morishita (Kogakuin University), Japan</i>
16:50 17:10	T4A3	<b>Turbomolecular pumps on active conical magnetic bearings</b>	T4B3	<b>H-infinity controller design for active magnetic bearing systems considering nonlinear vibrational rotordynamics</b>	T4C3	<b>A Self-bearing 8/6 Switched Reluctance Motor</b>
	10093	<i>Nicola Amati, *Angelo Bonfitto, Lester Daniel Suarez, Andrea Tonoli (Polytechnic University of Turin), Italy</i>	10090	<i>*Matthew Owen Thomas Cole (Chiang Mai University), Chakkapong Chamroom (University of Phayao), Patrick Sean Keogh (University of Bath), Thailand</i>	10036	<i>*Aino Manninen (VTT Technical Research Centre of Finland), Victor Mukherjee (Aalto University), Jenni Pippuri (VTT Technical Research Centre of Finland), Kari Tammi (Aalto University), Finland</i>
17:10 17:30	T4A4	<b>Mechanical design of reconfigurable active magnetic bearing test rig</b>	T4B4	<b>Control of Magnetic Bearings with Rotor-Mounted Accelerometers</b>	T4C4	<b>A Novel Bearingless Flux-Switching Permanent Motor</b>
	10100	<i>*Eerik Sikanen, Rafal Jastrzebski, Pekko Jaatinen, Teemu Sillanpaa, Alexander Smirnov, Jussi Sopanen, Olli Pyrhonen (Lappeenranta University of Technology), Finland</i>	10144	<i>*Samuel Jimenez, Patrick Keogh (University of Bath), UK</i>	10079	<i>*Chenyin Zhao, Huangqiu Zhu, Jintao Ju (Jiangsu University), China</i>
17:30 17:50	T4A5	<b>Design of Three-pole Radial-axial HMB with Independent Radial and Axial Carrying Capacity</b>	T4B5	<b>A smooth switch between different unbalance control parameters in rotor systems with active magnetic bearings</b>		
	10078	<i>*Jintao Ju, Huangqiu Zhu, Chenyin Zhao (Jiangsu University), China</i>	10002	<i>*Kai Zhang, Jiuchao Yin, Xingjian Dai (Tsinghua University), China</i>		

Friday, Aug. 5

Session		F1A	Design & Modeling II	F1B	Self-Sensing I	F1C	SBMs V
Time/Room			8:30 - 9:30 / Room A (2F)		8:30 - 9:30 / Room B (4F)		8:30 - 9:30 / Room C (4F)
Session Chairs			Toshiro Higuchi, Suyuan Yu		Myounggyu D. Noh, Feng Sun		Nobuyuki Kurita, Hubert Mitterhofer
8:30	8:50	F1A1	<b>(Invited Paper) Low Cost Active Magnetic Bearings - Concepts and Examples</b>	F1B1	<b>New Results on the Robustness of Self-sensing Magnetic Bearings</b>	F1C1	<b>Design Consideration for Performance Improvement in One-Axis Actively Positioned Single-Drive Bearingless Motor</b>
		10133	<i>*Paul Allaire, Brad Nichols, Tim Dimond, Jianming Cao, Simon Mushi (Rotor Bearing Solutions International), USA</i>	10030	<i>*Markus Hutterer, Matthias Hofer, Manfred Schroedl (Vienna University of Technology), Austria</i>	10138	<i>*Hiroya Sugimoto, Itsuki Shimura, Akira Chiba (Tokyo Institute of Technology), Japan</i>
8:50	9:10	F1A2	<b>Design Aspects of AMBs for High-Speed Permanent Magnet Synchronous Machine</b>	F1B2	<b>Smooth voltage controller and observer for a three-pole active magnetic bearing system</b>	F1C2	<b>High Torque Bearingless Flux-Switching Slice Drive</b>
		10014	<i>*Alexander Smirnov, Nikita Uzhegov (Lappeenranta University of Technology), Toni Hartikainen (Aurelia Turbines), Juha Pyrhonen, Olli Pyrhonen (LUT), Finland</i>	10102	<i>*Shyh-Leh Chen, Yung-Ho Hsiao (National Chung Cheng University), Taiwan</i>	10136	<i>*Karlo Radman (Linz Center of Mechatronics), Wolfgang Gruber (Johannes Kepler University Linz), Neven Bulic (University of Rijeka), Austria</i>
9:10	9:30	F1A3	<b>Design of AMB and Rotordynamics for a 30kW, 60 000 rpm Permanent-magnet Machine</b>	F1B3	<b>PCB Integrated Differential Current Slope Measurement for Position-Sensorless Controlled Radial Active Magnetic Bearings</b>	F1C3	<b>Homopolar Hyteresis Bearingless Motors</b>
		10053	<i>*Ziyuan Huang, Yun Le, Bangcheng Han (Beihang University), China</i>	10018	<i>*Matthias Hofer, Markus Hutterer, Manfred Schroedl (Vienna University of Technology), Austria</i>	10148	<i>*Minkyun Noh (Massachusetts Institute of Technology), Wolfgang Gruber (Johannes Kepler University Linz), David L. Trumper (MIT), USA</i>



Friday, Aug. 5

Session		F2A	Design & Modeling III	F2B	Self-Sensing II	F2C	SBMs VI
Time/Room			9:40 - 10:40 / Room A (2F)		9:40 - 10:40 / Room B (4F)		9:40 - 10:40 / Room C (4F)
Session Chairs			Paul Allaire, Takeshi Mizuno		Yuichi Ariga, Shyh-Leh Chen		Rafal Piotr Jastrzebski, Hiroya Sugimoto
9:40	10:00	F2A1	<b>Design of an Enlarged Wind Tunnel System for Spinning Body Using Magnetic Suspension</b>	F2B1	<b>Algorithms for self-sensing magnetic bearings using current signals and least square identification</b>	F2C1	<b>Flux-Linkage Model Including Cross Saturation for a Bearingless Synchronous Reluctance Motor</b>
		10141	<i>*Shahajada Mahmudul Hasan, Takeshi Mizuno, Masaya Takasaki, Yuji Ishino (Saitama University), Japan</i>	10023	<i>*Daniel Franz, Michael Richter, Stephan Rinderknecht (Technical University of Darmstadt), Germany</i>	10035	<i>*Seppo E. Saarakkala, Maksim Sokolov, Victor Mukherjee (Aalto University), Jenni Pippuri (VTT Technical Research Centre of Finland), Kari Tammi, Anouar Belahcen, Marko Hinkkanen (Aalto University), Finland</i>
10:00	10:20	F2A2	<b>Design and evaluation of high-speed solid rotor induction machine supported by AMBs with a multidisciplinary tool</b>	F2B2	<b>Application of Soft Magnetic Composites (SMCs) in Position-Sensorless Controlled Radial Active Magnetic Bearings</b>	F2C2	<b>Basic Design of the Maglev Pump for Total Artificial Heart by using Double Stator Type Axial Self-bearing Motor</b>
		10015	<i>*Alexander Smirnov, Nikita Uzhegov, Teemu Sillanpaa, Juha Pyrhonen, Olli Pyrhonen (Lappeenranta University of Technology), Finland</i>	10019	<i>*Matthias Hofer, Markus Hutterer, Manfred Schroedl (Vienna University of Technology), Austria</i>	10105	<i>*Nobuyuki Kurita, Takeo Ishikawa, Naoki Saito (Gunma University), Toru Masuzawa (Ibaraki University), Japan</i>
10:20	10:40	F2A3	<b>The design of a centrifugal blower rotor with magnetic bearings based on rotor dynamics</b>	F2B3	<b>An analytical frequency-domain model of self-sensing magnetic bearing: modulation approach</b>	F2C3	<b>Active suppression of structural force harmonics in PM bearingless motors</b>
		10085	<i>*Junting Wang, Jiageng Su, Suyuan Yu (Tsinghua University), China</i>	10033	<i>*Jie Yu, Changsheng Zhu (Zhejiang University), China</i>	10099	<i>*Blaise Lapotre, Babak Nahid-Mobarakeh, Nouredine Takorabet, Farid Meilbody-Tabar (University of Lorraine), Ramdane Lateb, Joaquim Da Silva (SKF Magnetic Mechatronics), France</i>



Saturday, Aug. 6

Session	S1A	Design & Modeling IV	S1B	Control IV	S1C	SBMs VII
Time/Room		8:30 - 9:50 / Room A (2F)		8:30 - 9:50 / Room B (4F)		8:30 - 9:50 / Room C (4F)
Session Chairs		Mochimitsu Komori, Alexander Smirnov		Jarir Mahfoud, Mitsuo Hirata		Shuqin Liu, Hiroyuki Onuma
8:30 8:50	S1A1	<b>Basic Study on Active Magnetic Bearing working in Liquid Nitrogen</b>	S1B1	<b>Rotordynamic Behavior and Rigid Mode Vibration Control by Hybrid Foil-Magnetic Bearing System</b>	S1C1	<b>Experimental Verification of a Model-Based Zero and Low-Speed Angle Observer for Bearingless Permanent Magnet Machines</b>
	10147	<i>Mochimitsu Komori, Kenshi Watanabe, *Hirohisa Katou, Ken-ichi Asami, Nobuo Sakai (Kyushu Institute of Technology), Japan</i>	10161	<i>*Sena Jeong (Korea Institute of Science and Technology), Doyoung Jeon (Sogang University), Yongbok Lee (KIST), South Korea</i>	10039	<i>*Tobias Wellerdieck, Pascal Reichmuth (Federal Institute of Technology, Zurich), Daniel Steinert (Levitronix), Johann W. Kolar (ETH), Switzerland</i>
8:50 9:10	S1A2	<b>Six Pole type Hybrid Magnetic Bearing for Turbo-Machinery</b>	S1B2	<b>Control of an AMB to Zero Static Force</b>	S1C2	<b>Analysis of Electromagnetic Force Ripple on the Rotor of a Bearingless Synchronous Reluctance Motor</b>
	10028	<i>*Yohji Okada, Masaki Touno, Ken-Ichi Matsuda, Ryou Kondo (Ibaraki University), Takashi Todaka (Oita University), Japan</i>	10026	<i>Michael Caple, *Eric Maslen, Jacquelyn Nagel, Jacob Wild (James Madison University), USA</i>	10003	<i>*Victor Mukherjee (Aalto University), Aino Manninen, Jenni Pippuri (VTT Technical Research Centre of Finland), Anouar Belahcen (Aalto University, Tallinn University of Technology), Finland</i>
9:10 9:30	S1A3	<b>Updating the model of a rotor with surface mounted permanent magnets in an active magnetic bearing rotor system</b>	S1B3	<b>On the dynamics of rotating machinery supported by AMB during base motion</b>	S1C3	<b>Magnetic Levitation Performance of Miniaturized Magnetically Levitated Motor with 5-DOF Active Control</b>
	10010	<i>*Jouni Vuojolainen, Alexander Smirnov, Rafal Jastrzebski, Teemu Sillanpaa, Behnam Ghalamchi (Lappeenranta University of Technology), Toni Hartikainen (Aurelia Turbines), Olli Pyrhonen (LUT), Finland</i>	10044	<i>*Clement Jarroux, Jarir Mahfoud, Regis Dufour (University of Lyon), Benjamin Defoy, Thomas Alban (GE Oil &amp; Gas), France</i>	10106	<i>*Masahiro Osa, Toru Masuzawa, Takuya Saito (Ibaraki University), Eisuke Tatsumi (National Cerebral and Cardiovascular Center Research Institute), Japan</i>
9:30 9:50	S1A4	<b>Parameter Identification for Stiffness and Damping in AMB-Flexible Rotor System</b>	S1B4	<b>Unbalance force observer and compensator of magnetic bearings supporting centrifugal compressor</b>	S1C4	<b>5-Degree of Freedom Active Position Control of an Axial Self-bearing Motor with Six Concentrated Stator Windings</b>
	10027	<i>*Kejian Jiang (Zhejiang Sci-Tech University), Changsheng Zhu (Zhejiang University), China</i>	10107	<i>*Kexiang Li, Zhiquan Deng, Chengzi Liu, Jie Zhou, Jiayi He (Nanjing University of Aeronautics and Astronautics), Jiaqiang Ning (Nanjing Engineering Institute of Aircraft Systems), China</i>	10142	<i>*Changan Jiang, Kazuaki Andou, Satoshi Ueno (Ritsumeikan University), Japan</i>

Saturday, Aug. 6

Session	S2A	Design & Modeling V	S2B	Control V	S2C	SBMs VIII, PMBs I
Time/Room		10:20 - 12:00 / Room A (2F)		10:20 - 12:00 / Room B (4F)		10:20 - 12:00 / Room C (4F)
Session Chairs		Toshihiko Sugiura, Jin Zhou		Shai Arogeti, Tetsuzo Sakamoto		Gerald Jugmayr, Tadahiko Shinshi
10:20 10:40	S2A1 10025	<b>On system identification for active magnetic bearings at nonzero speeds</b> <i>*Adolfo Anta, Rosa Castane Selga, Mohamed Osama (GE Global Research), Thomas Alban, Benjamin Defoy (GE Oil &amp; Gas), Germany</i>	S2B1 10150	<b>Direct Field Control of AMBs using Flux Feedback based on Integrable Hall Sensors</b> <i>*Falk Bahr (Dresden University of Technology), Ingolf Moench (IFW Dresden), Daniel Ernst, Thomas Zerna (TUD), Oliver G. Schmidt (IFW Dresden), Wilfried Hofmann (TUD), Germany</i>	S2C1 10116	<b>Development of radial type self-bearing motor for small centrifugal blood pump</b> <i>*Hiroyuki Onuma (National Institute of Technology, Ibaraki College), Toru Masuzawa, Michiko Murakami (Ibaraki University), Japan</i>
10:40 11:00	S2A2 10011	<b>Using a pseudorandom binary sequence for rotor-bearing system identification in active magnetic bearing rotor systems</b> <i>*Jouni Vuojolainen, Rafal Jastrzebski, Olli Pyrhonen (Lappeenranta University of Technology), Finland</i>	S2B2 10049	<b>Modeling and Control of Magnetic Bearings With Nonlinear Magnetization (Simulation vs. Experiment)</b> <i>Ali Gerami, *Roger Fittro, Carl Knospe (University of Virginia), USA</i>	S2C2 10143	<b>Development of a Centrifugal Cryogenic Fluid Pump using an Axial Self-bearing Motor</b> <i>*Ryo Takeda, Satoshi Ueno, Changan Jiang (Ritsumeikan University), Japan</i>
11:00 11:20	S2A3 10069	<b>Identification of Parameters in Active Magnetic Bearing Systems</b> <i>*Andreas Jauemik Voigt (Lloyd's Register Consulting, Technical University of Denmark), Jonas Lauridsen, Christian Mandrup-Poulsen (DTU), Kenny Krogh Nielsen (Lloyd's Register Consulting), Ilmar F. Santos (DTU), Denmark</i>	S2B3 10073	<b>Bias Flux Compensation in the 'Side-By-Side' Combination Radial/Axial Homopolar PM-Biased Active Magnetic Bearing</b> <i>*Alexei Filatov, Larry Hawkins, Chinmay Ukidve (Calnetix Technologies), USA</i>	S2C3 10126	<b>Stability improvement of passively stabilized degrees of freedom in magnetically levitated systems</b> <i>*Hubert Mitterhofer (Linz Center of Mechatronics), Gerald Jungmayr (Johannes Kepler University Linz), Austria</i>
11:20 11:40	S2A4 10088	<b>Identification of Active Magnetic Bearing Systems Utilizing a Modulating Function Technique</b> <i>Olga Gavrilenko, Johann Reger, *Dennis Roeser, Thomas Sattel (Ilmenau University of Technology), Germany</i>	S2B4 10155	<b>Duality parameter of Approximate Dual Control for Electromagnetic Suspension</b> <i>*Kento Osako, Tetsuzo Sakamoto (Kyushu Institute of Technology), Japan</i>	S2C4 10101	<b>Dynamic characterization of electrodynamic bearings combined with active magnetic dampers</b> <i>*Qingwen Cui (Swiss Federal Institute of Technology in Lausanne), Fabrizio Impinna, Lester D. Sauerz Cabrera, Joaquim G. Detoni, Nicola Amati, Andrea Tonoli (Polytechnic University of Turin), Hannes Bleuler (EPFL), Switzerland</i>
11:40 12:00	S2A5 10087	<b>Identification of Dynamic Parameters for Flexible Rotor AMBs System Considering Residual Unbalances</b> <i>*Yuanping Xu, Jin Zhou, Chaowu Jin, Longxiang Xu (Nanjing University of Aeronautics and Astronautics), China</i>	S2B5 10109	<b>Precision positioning oriented modeling of electromagnetic actuator</b> <i>*Sergei Basovich, Yonattan Menaker, Shai Arogeti (Ben-Gurion University of the Negev), Israel</i>	S2C5 10132	<b>An Axial flow blood pump with magnetic fluid mixed support</b> <i>*Shuqin Liu (Shandong University), H. Ming Chen (Shandong engineering research center for magnetic bearings), China</i>

Saturday, Aug. 6

Session	S3A	Backup Bearings I	S3B	Control VI	S3C	PMBs II
Time/Room		13:50 - 15:10 / Room A (2F)		13:50 - 15:10 / Room B (4F)		13:50 - 15:10 / Room C (4F)
Session Chairs		Matthew Owen Thomas Cole, Kejian Jiang, Lukas Quurck		Zongli Lin, Eric Harvey Maslen		Masahiro Osa, Juan de Santiago
13:50 14:10	S3A1 10124	<b>Influence of Unbalance Levels on Nonlinear Dynamics of a Rotor-Backup Rolling Bearing System</b> <i>*Cesar Fonseca, Ilmar Santos (Technical University of Denmark), Hans Weber (Pontifical Catholic University of Rio de Janeiro), Denmark</i>	S3B1 10029	<b>Advanced Control Performance in Compressor Surge</b> <i>Emil Kurvinen (FS Dynamics), *Roger Fittro (University of Virginia), Eric Maslen (James Madison University), Finland</i>	S3C1 10045	<b>Evaluation of the electrodynamic forces in a high-speed permanent magnet machines with rotor eccentricity</b> <i>Corentin Dumont (Universite catholique de Louvain), Adrien Gilson (University of Franche-Comte), Virginie Kluykens (UCL), Christophe Espanet (UFC), *Bruno Dehez (UCL), Belgium</i>
14:10 14:30	S3A2 10163	<b>Dynamic Conditions to Destabilize Persistent Rotor/Touchdown Bearing Contact in AMB Systems</b> <i>*Patrick Sean Keogh (University of Bath), Matthew Owen Thomas Cole (Chiang Mai University), UK</i>	S3B2 10005	<b>Autobalancing of AMB Systems Using a Differential Regulator Based Output Regulation Approach</b> <i>*Long Di (University of Virginia), Se Young Yoon (University of New Hampshire), Zongli Lin (UVA), USA</i>	S3C2 10158	<b>Round Layout Halbach Array using Cylinder Shaped Permanent Magnets</b> <i>*Haruhiko Suzuki, Masatoshi Kanamaru, Mizuki Sato, Shogo Tokunaga, Shuichiro Kainuma, Atsushi Ito (National Institute of Technology, Fukushima College), Japan</i>
14:30 14:50	S3A3 10051	<b>Transient Simulation of magnetic bearing and backup bearing interaction in a high speed rotary atomizer subjected to impulsive loads</b> <i>*Larry Hawkins, Zhiyang Wang (Calnetix Technologies), Vishal Wadhvani (Dedert Corporation), USA</i>	S3B3 10117	<b>Inertial Centering of Magnetically Suspended Flexible Rotors</b> <i>*Rami Levy, Shai Arogeti (Ben-Gurion University of the Negev), Israel</i>	S3C3 10092	<b>A systematic approach for modeling and identification of eddy current dampers in rotordynamic applications</b> <i>*Qingwen Cui (Swiss Federal Institute of Technology in Lausanne), Maria di Napoli, Joaquim Detoni, Nicola Amati, Andrea Tonoli (Polytechnic University of Turin), Italy</i>
14:50 15:10	S3A4 10006	<b>An Investigation into Backup Bearing Life using Quantified Rotor Delevitation Severity Indicators</b> <i>*Jacob Marthinus Gouws, Jan Jacobus Janse van Rensburg (North-West University of Potchefstroom), South Africa</i>	S3B4 10062	<b>Field Dynamic Balancing System Based on Labview in AMB-Flexible Rotor System</b> <i>*Jingjing Zhao, Zhe Sun, Xunshi Yan, Zhengang Shi (Tsinghua University), China</i>	S3C4 10034	<b>Design of Permanent Magnet Levitation Roller for Belt Conveyer</b> <i>Huachun Wu, Yongwu Ren, Shiping Yang (Wuhan University of Technology), Nianxian Wang (Wuhan University of Science and Technology), *Chunsheng Song, Yefa Hu (WUT), China</i>

Saturday, Aug. 6

Session	S4A	Backup Bearings II	S4B	Control VII	S4C	PMBs III
Time/Room		15:40 - 17:20 / Room A (2F)		15:40 - 17:20 / Room B (4F)		15:40 - 17:20 / Room C (4F)
Session Chairs		Jan Jacobus Janse van Rensburg, Zixi Wang		Roger Fittoro, Patrick Sean Keogh		Alexei Filatov, Chunsheng Song
15:40 16:00	S4A1	<b>Rotor Drop Analyses and Auxiliary Bearing System Optimization for AMB Supported Rotor/Experimental Validation - Part I: Analysis Method</b>	S4B1	<b>Control of Flexible Rotor by Using Electromagnetic Actuators: Optimization of the Fuzzy Controller Gains</b>	S4C1	<b>Comparison between optimized topologies of permanent magnet thrust bearings with back-iron</b>
	10127	<i>Jianming Cao, *Paul Allaire, Timothy Dimond (Rotor Bearing Solutions International), JJ. Janse van Rensburg (North-West University of Potchefstroom), Christian Klatt (CEROBEAR), USA</i>	10021	<i>Michael Soler Beatty, *Jarir Mahfoud (University of Lyon), France</i>	10046	<i>*Maxence Van Beneden, Virginie Kluyskens, Bruno Dehez (Universite catholique de Louvain), Belgium</i>
16:00 16:20	S4A2	<b>Rotor Drop Analyses and Auxiliary Bearing System Optimization for AMB Supported Rotor/Experimental Validation - Part II: Experiment and Optimization</b>	S4B2	<b>Simple and Effective Dynamic Model Identification Procedure of Magnetically Suspended Flexible Rotor Systems</b>	S4C2	<b>Eigen frequency and damping in a passive magnetic bearing system</b>
	10128	<i>Jianming Cao, *Paul Allaire, Timothy Dimond (Rotor Bearing Solutions International), JJ. Janse van Rensburg (North-West University of Potchefstroom), Christian Klatt (CEROBEAR), USA</i>	10118	<i>Rami Levy, *Shai Arogeti (Ben-Gurion University of the Negev), Israel</i>	10042	<i>*Juan de Santiago (Uppsala University), Janaina G. Oliveira (Federal University of Juiz de Fora), Elkin Rodriguez (Federal University of Rio de Janeiro),Guilherme G. Sotelo (Fluminense Federal University),Magnus Hedlund (Uppsala University), Richard M. Stephan (UFRJ), Sweden</i>
16:20 16:40	S4A3	<b>Planetary backup bearings for high speed applications and service life estimation methodology</b>	S4B3	<b>Nonlinear Control Type Magnetic Bearing for Adding Damping Force to Existing Rotor</b>	S4C3	<b>Numerical Verification of Amplitude Reduction of a Rotor Supported by a Superconducting Magnetic Bearing Utilizing Internal Resonance</b>
	10065	<i>*Lukas Quurck, Benedikt Schuessler, Daniel Franz, Stephan Rinderknecht (Technical University Darmstadt), Germany</i>	10098	<i>*Yuichi Ariga, Yasumitsu Sakai (Yamagata University), Japan</i>	10140	<i>*Koki Kanda, Hiromu Sasaki, Masahiko Sasaki, Toshihiko Sugiura (Keio University), Japan</i>
16:40 17:00	S4A4	<b>Research and experiment of auxiliary bearing for helium circulator of HTR-PM</b>	S4B4	<b>Vibration reduction in a hollow-shaft rotor using flexibly-mounted internal-stator magnetic bearings</b>	S4C4	<b>Hysteresis in an axial rotating SMB used in the ring spinning process</b>
	10057	<i>*Guojun Yang, Zhengang Shi, Jingjing Zhao, Yan Zhou, Xingnan Liu, Ni Mo, Zhe Sun (Tsinghua University), China</i>	10162	<i>*Chris Lusty, Patrick S. Keogh (University of Bath), UK</i>	10067	<i>*Anne Berger, Maria Sparing, Gunter Fuchs (IFW Dresden), Mahmud Hossain, Anwar Abdkader, Chokri Cherif (Technical University of Dresden), Ludwig Schultz, Kornelius Nielsch (IFW Dresden), Germany</i>
17:00 17:20	S4A5	<b>A performance analysis model with thermodynamic and superficial effects of the touchdown bearings in AMB systems</b>	S4B5	<b>Vibration control for active magnetic bearing high-speed flywheel-rotor system with inverse system method and two-degree-of-freedom PID control</b>	S4C5	<b>Trial of Large Gap Using Superconducting Magnetic Suspension System</b>
	10031	<i>*Mindong Lv, Zixi Wang, Yuming Wang (Tsinghua University), China</i>	10058	<i>*Chuan Mao, Liangliang Chen, Changsheng Zhu (Zhejiang University), China</i>	10146	<i>Akira Minoda, *Mochimitsu Komori, Kaoru Nemoto, Ken-ichi Asami, Nobuo Sakai (Kyushu Institute of Technology), Japan</i>