# Welcome to Maglev 2022

The 25th International Conference on Magnetically Levitated System and Linear Drives (Maglev), originally scheduled to be held in Changsha, China in 2020, is postponed to October 17-19, 2022, due to the COVID-19 pandemic. This will be the first hybrid session since the first one was held in 1977. Considering the various time zones of the residential places of the participants, this conference is arranged in a time span that is convenient for experts from all over the world to participate in and meanwhile, the schedule is compact. We hope that every attendee can participate in this conference with ease. The organizer of the conference welcomes all participants to visit Changsha at their convenience, ride on Maglev in Hunan and exchange insights into the development of Maglev transportation. Maglev 2022 is open to experts, scholars, decision-makers, planners, and designers engaged in the Maglev and linear drive industry, as well as any interested citizens.

This conference received 102 papers on the conference theme. These papers will be shared in the form of speeches, reports, posters, etc. All contributions will also be edited into a conference proceedings for distribution among the paper contributors and other participants.

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# Maglev 2022 Conference

# International Steering Committee (ISC)

## Honorary Chair:

| | |
|---|---|
| **Eisuke Masada** | Railway Technical Research Institute, Japan |

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| | |
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| **Laurence Blow** | Maglev Transport, USA |
| **Vincent Bourquin** | University of Applied Sciences of Western Switzerland, Switzerland |
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| **Zigang Deng** | Southwest Jiaotong University, China |
| **Sansan Ding** | CRRC Qingdao Sifang Co., Ltd., China |
| **Johannes Kluehspies** | The International Maglev Board, Germany |
| **Guobin Lin** | Tongji University, China |
| **Friedrich Loeser** | Thyssenkrupp Transrapid, Germany |
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| **Byung-Chun Shin** | KIMM, Korea |
| **Sergei Smirnov** | Emperor I Saint-Petersburg State Transport University, Russia |
| **Richard M. Stephan** | Federal University of Rio de Janeiro, Brazil |
| **Motoaki Terai** | Central Japan Railway Company, Japan |
| **Masaru Tomita** | Railway Technical Research Institute, Japan |
| **Michael Witt** | The International Maglev Board, Germany |
| **Konrad Woronowicz** | Bombardier Transportation, Canada |
| **Xiao Liang** | Hunan Rail Transit Holding Group Co., Ltd., China |

# Organizing Committee

## Advisory Committee

| | |
|---|---|
| **Prof. Hiroyuki Ohsaki** | The University of Tokyo, Japan |
| **Mr. Michael Witt** | The International Maglev Board, Germany |
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| **Dr. Friedrich Loeser** | Thyssenkrupp Transrapid, Germany |
| **Prof. Richard M. Stephan** | Federal University of Rio de Janeiro, Brazil |

## Conference General Chair

| | |
|---|---|
| **Dr. Wenwei Xiao** | Hunan Rail Transit Holding Group Co., Ltd., China |

## Conference Co-Chairs

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|---|---|
| **Prof. Guobin Lin** | Tongji University, China |
| **Prof. Johannes Kluehspies** | The International Maglev Board, Germany |
| **Prof. Sansan Ding** | CRRC Qingdao Sifang Co., Ltd., China |
| **Prof. Zhiqiang Long** | National University of Defense Technology, China |
| **Prof. Zigang Deng** | Southwest Jiaotong University, China |

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| **Dr. Xiao Liang** | Hunan Rail Transit Holding Group Co., Ltd., China |

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| **Prof. Wei Xu** | Huazhong University of Science and Technology, China |
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| **Prof. Yougang Sun** | Tongji University, China |
| **Prof. Zhixun Ma** | Tongji University, China |

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| **Dr. Ke Huang** | Tongji University, China |
| **Dr. Ziping Han** | Tongji University, China |
| **Mr. Yuheng Ai** | Tongji University, China |

# Conference Overview

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# Conference Venue

## Conference Contact:

**Mr. Qingxiang Fu** Email: justin_fu@maglev2020.com

**Ms. Zhuo Wen** Email: sue_wen@maglev2020.com

## Online Meeting Room (Zoom):

| Meeting Room (Zoom) | Link | ID | Password |
|---|---|---|---|
| **Maglev 2022 - Opening Ceremony & Keynote Speech** | Link_O | 840 7502 5408 | maglev2022 |
| **Maglev 2022 - A Session "Structure & Dynamics"** | Link_A | 882 9203 3741 | |
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| **Maglev 2022 - C Session "Development, Application & Related Topics"** | Link_C | 838 0294 8724 | |
| **Maglev 2022 - P Session Poster & Closing Ceremony** | Link_P | 846 6561 6582 | |

## Software Download:

**You can download Zoom meeting software here:**

**PC User:** Windows Mac

**Mobile User:** Android iOS device users please download in App Store

# Keynote Speeches

## Title of the report 1:

**Chuo Shinkansen Project using Superconducting Maglev Technology**

**Abstract:**

The superconducting Maglev system has been developed in Japan for over 50 years with the aim of applying it to super high-speed railways. The system is based on the electrodynamic suspension and linear synchronous motor propulsion. The superconducting Maglev vehicles have on-board magnets using NbTi superconducting wire cooled with liquid helium. Since 1997 the superconducting Maglev system has been tested at Yamanashi Test Line in Japan. At that time, the length of the test line was 18.4 km, but it was extended to 42.8 km. Currently, running tests are being conducted on the extended test line. The maximum speed of 603 km/h was recorded on April 21, 2015. The superconducting Maglev system technology is ready for the Chuo Shinkansen, a Tokaido Shinkansen Bypass connecting three major metropolitan areas in Japan. The construction of the Chuo Shinkansen started in 2014. The Chuo Shinkansen will be opened between Tokyo and Nagoya in 2027 (planed, probably delayed). It allows us to travel 286 km between Tokyo and Nagoya in 40 minutes. The line will be extended to Osaka, hopefully by around 2037. While the Tokaido Shinkansen connects between Tokyo and Osaka in about two and a half hours, the superconducting Maglev train will be able to connect between them in about one hour. Between Tokyo and Osaka, it is possible to achieve high speeds that can compete with aircraft, and significantly lower carbon emission than aircraft.

Prof. **Hiroyuki Ohsaki** received the B. E., M. E., and Dr. Eng. degrees in electrical engineering from the University of Tokyo, Japan, in 1983, 1985 and 1988, respectively. He joined the Department of Electrical Engineering, the University of Tokyo in 1988. From 2004 he is a Professor at the Department of Advanced Energy, Graduate School of Frontier Sciences, the University of Tokyo, Japan. From April 2019 to March 2021, he was the Dean of the Graduate School of Frontier Sciences, the University of Tokyo. His current research interests include applied superconductivity, electrical machines, linear drive systems, magnetic levitation technology, etc. Prof. Ohsaki was the President of the Institute of Electrical Engineers of Japan from May 2021 to May 2022. He was the chair of the IEEE Power & Energy Society Japan Joint Chapter in 2017 and 2018. He is a fellow of the Institute of Physics and the Institute of Electrical Engineers

of Japan. Prof. Ohsaki is the chair of the International Steering Committees of both the International Symposium on Linear Drives for Industry Applications (LDIA) and the International Conference on Magnetically Levitated Systems and Linear Drives (Maglev).

## Title of the report 2:

**Research on Key Technologies of High-speed Maglev Transportation System**

**Abstract:**

The 600km/h high-speed Maglev transportation system development is organized by CRRC, led by CRRC Sifang Co., Ltd. Domestic major researching forces in Maglev, high-speed railway and other related fields has been brought together to build up the innovative team of "production, education, research and application" to conquer the major technological challenges.

It took 6 years to achieve the 600 km/h high-speed Maglev key technology series, systematically solved engineering problems including speed improvement, complex environment adaptability, and core system development. Major breakthroughs have been made in complete sets of engineering technologies including system integration, vehicles, traction power supply, operation control communication, and track technology. China's first high-speed Maglev transportation system has already been successfully developed with complete proprietary intellectual property rights, realizing system integration and joint testing, establishing collaborative innovation platforms including simulation, testing, trial production platforms and test lines to support the research and development of the entire high-speed Maglev system, mastering the key methods of design simulation, test verification and evaluation, building the independent industrial chain, and forming the sustainable independent innovation and industrialization supporting capabilities of high-speed Maglev, marking that China has basically mastered the complete set of high-speed Maglev technologies and engineering capabilities and the conditions to further advance high-speed testing and engineering demonstrations. Continuous research will further be carried out on the promotion and application of the 600km/h high-speed Maglev system and related fundamental technologies.

Prof. **Sansan Ding**, born in August 1967, Doctor, Professorate senior engineer, Scientist of CRRC, Deputy-Chief-Engineer of CRRC Qingdao Sifang Co., Ltd., member of the International Maglev Board, Director-Committee-Member of the Rail Transit Special Committee of the Chinese society for composite materials, Deputy-Secretary-General of the Standardization Committee of the China Railway Society, expert

with special government allowances from the State Council. Head of the 600 km/h high-speed Maglev transportation system project, leading of EMU projects including the "CRH" and "CR" series. Prof. Ding has presided over 10 major projects at the provincial-ministerial level and above, authorized over 100 inventions, 50 papers, 1 high-speed Maglev monograph, and has been awarded more than 30 scientific and technological honors of provincial-ministerial level.

## Title of the report 3:

**Benefits of a disruptive Technology in Passenger Transport**

**Abstract:**

"High-speed Maglev systems represent a fundamental innovation in transportation. Do these new high-speed Maglev systems, which encounter an established wheel-rail oligopoly market, have a disruptive effect? To answer this question, brief analyses of infrastructure and environmental issues, transportation network and interoperability, customer interests, and transportation industry interests are summarized".

Prof. **Johannes Kluehspies** is the President of the International Maglev Board, holds a Master's Degree in Urban and Transport Geography from Technical University of Munich, a PhD in Transport Geography from University of Bochum, and a post-doctorate degree (Dr. habilitatus) from the University of Leipzig, Germany. He was awarded a doctor honoris causa by the Emperor Alexander I. St. Petersburg State Transport University, Russian Federation.

Mr. **Michael Witt** is an engineer and expert for Transrapid Maglev Technology. He is an elected member of the International Maglev Steering Committee (ISC). Mr. Michael Witt worked for many years as Head of the Consultancy Division for Multi Modal Transportation projects and programmes for TÜV Rheinland, for the German Ministry of Research and Technology, for Dornier Consulting and for Lahmeyer International. He gained long-time experience with large public projects and economical and technology transportation studies. For the Federal Ministries of Transport as well as Research and Technology, he coordinated national, European and international transport

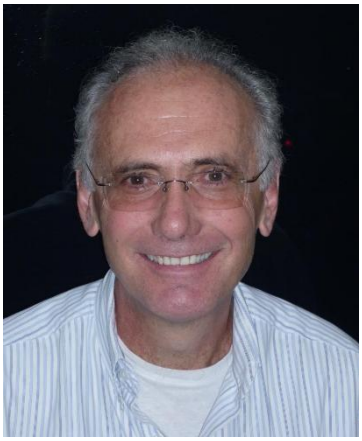
development programmes for logistics/transports chains and projects for new technology transport systems like Maglev. He supervised the tender process for high speed railway systems in the VAE and Qatar as Vice President of the German Railway Consulting. Among his activities it has been also the evaluation of GNSS applications in transportation and the bid and tender process for transport technology systems. He has well-proven expertise in management skills and system engineering, control of multi modal transport systems, analysis of user requirements and marketing aspects as well as stakeholder analysis.

## Title of the report 4:

**Past, Present and Future of Superconducting Magnetic Levitation**

**Abstract:**

A review of Superconducting Magnetic Levitation (SML) applied to Maglev trains will be presented. The paper is divided into low-speed and high-speed Maglev. The promising perspectives will close this review.



Prof. **Richard M. Stephan** received the B.Sc. degree from Instituto Militar de Engenharia (IME), Rio de Janeiro, in 1976; the M.Sc. degree from Universidade Federal do Rio de Janeiro (COPPE/UFRJ) in 1980; and the Dr.-Ing. degree from Ruhr Universität Bochum, Germany, in 1985; all in Electrical Engineering. He has an MBA degree (2005) from the Center for Scientific Enterprise, London (CSEL), on Technology Enterprise Development. During 1977, he worked as an engineer at Furnas Centrais Elétricas, Rio de Janeiro. Since 1978, he has been with the Department of Electrical Engineering, UFRJ. He spent a sabbatical leave at CEPEL, the Research Center of ELETROBRAS, in 1993. His main interests are in the fields of applications of superconductivity, Maglev technology, control of electrical drives and power electronics. Dr. Stephan is a former president of SOBRAEP (Brazilian Society of Power Electronics), Senior Researcher of CNPq, Senior Member of IEEE and since 2019 member of the Brazilian Academy of Engineering.

Prof. **Zigang Deng** is currently a professor, doctoral supervisor of Southwest Jiaotong University and the Deputy Director of Research Center for Super-High-Speed Evacuated Tube Maglev Transport. He is the leader of Sichuan Youth Science and Technology Innovation team of HTS Maglev, the member of International Steering Committee of the International Conference on Magnetically Levitated Systems and Linear Drives (Maglev). Winner of the Postdoctoral Fellowship of the Japan Society for the Promotion of Science (JSPS), the first Xplore Prize of Tencent Foundation and the National Excellent Young Scientists Fund. His research interests mainly focus on High Temperature Superconducting (HTS) Maglev technologies for rail transit applications and Evacuated Tube Maglev Systems. Under his promotion and execution, the Evacuated Tube HTS Maglev Vehicle Test System was developed successfully in 2014. In 2021, as the main researcher, his research results had effectively and successfully supported the development of the world's first HTS high-speed Maglev Engineering Prototype and Test Line. Prof Deng has presided over 10 projects from National Natural Science Foundation of China and Sichuan Science and Technology Funds. Up to now, he has published over 150 SCI papers with more than 2800 citations and authorized 40 invention patents.

## Title of the report 5:

**The Construction and Operation of Fenghuang Maglev Sightseeing Line**

**Abstract:**

As the construction and operation technology of urban Maglev is getting mature, "culture + tourism + Maglev" has become a new application scenario of Maglev technology. Hunan Rail Transit Holding Group innovatively integrated the Maglev vehicle into the cultural tourism of the ancient town of Fenghuang from three aspects: technology, operation, and business model. After three years of effort in planning, design, construction, manufacturing, commissioning, and the creation of supporting cultural tourism facilities, the project is officially put into operation on July 30, 2022. The performance of initial operation shows that the features of urban Maglev, such as technology content, good safety, low noise, low vibration and low carbon footprint, give it a unique advantage in tourist attractions and worthy of extensive application. It is believed that the Maglev will play a important role in the tourism-oriented rail industry in the coming years.

Dr. **Xiao Liang**, Hunan Rail Transit Holding Group Co., Ltd., professor-level senior engineer with a PhD in engineering, his research focuses on the vehicle-guideway-bridge coupling vibration of Maglev system. Dr. Liang has rich experience in construction and operation in the field of urban Maglev: from 2014 to 2017, he was the technical leader of Changsha Maglev Express, the first urban Maglev project in China; from 2019 to 2022, he was the engineering and technical leader of Fenghuang Maglev Sightseeing Line – the second Maglev project in Hunan Province. In 2020, he led a technical team for the speed up test of EMS urban Maglev, and increased the maximum operating speed of Changsha Maglev Express to 160km/h. He is a member of the International Steering Committee of Maglev 2018 and Maglev 2022, and also one of the main organizers of Maglev 2022.

## Title of the report 6:

**Complex Evaluation of Maglev Transport Lines Construction Effectiveness**

**Abstract:**

Despite the encouraging performance of Maglev transport technology, there are a very small number of implemented projects in the world, the number of future projects is still far from significant. The Maglev transport technology is outperforming high-speed rail in its niche, and this may have a negative impact on the future of Maglev lines, since the railway lines under construction have a long life cycle before a decision is made about their possible replacement.

Mr. **Sergei Smirnov,** Positions: 1) Head of A.A. Zaitsev Scientific-education center of passenger railway transport innovative development of Emperor Alexander I Saint-Petersburg State Transport University; 2) Head of Scientific research laboratory of Innovative transport development of Emperor Alexander I Saint-Petersburg State Transport University; 3)Vice-president of International Transport Academy; 4) Head of Russian Maglev project.

Scientific interests / areas of activities: 1) Strategical development of transportation systems;2) Economics and development of railway transport; 3) Development of magnetic levitation transportation system.

## Title of the report 7:

**Introduction to hyperloop system characteristics and applications**

**Abstract:**

In the hyperloop, magnetically levitated autonomous vehicles travel through a network of low-pressure tubes. The vehicles can transport both passengers and cargo. Due to the low-pressure, the aerodynamic drag is limited, reducing the energy consumption. The vehicles are magnetically guided and suspended using an electromagnetic suspension. A lane switch with zero moving components in the infrastructure allows vehicles to merge and diverge at high speeds. The vehicles are propelled using a synchronous reluctance motor with the active component on the vehicle. The vehicles are powered by batteries which are charged periodically through inductive charging from the infrastructure. By banking in the corners, better cornering than high-speed rail is achieved. Core technologies have been proven at various test benches and prototypes at Hardt's test site in the Netherlands. Currently, the 400m European Hyperloop Center in Groningen is under construction, which will demonstrate the zero moving component lane switch at 100 km/h. Due to the network effects achieved with the lane switch, hyperloop can be used for regional, national and international transport applications at various operating speeds.

Mr. **Mars Geuze** is Chief Commercial Officer at Hardt Hyperloop, the European hyperloop technology provider. Backed by an investment from the European Commission, Hardt is paving the way to certify hyperloop and realize the global hyperloop network. Within Hardt, Mars is responsible for market development. Mars co-founded the Delft Hyperloop team, which was the overall winner of the first Elon Musk Hyperloop Competition and has been active in hyperloop development for over 7 years. Previously, Mars built world-record breaking electric race cars in Formula teams. Mars holds a BSc in Applied Physics from the Technical University of Delft.

# Oral Presentations

## Session A: Structure & Dynamics

| 18:00-21:30, 19. Oct. 2022 | | | Meeting No.: 882 9203 3741 |
|---|---|---|---|
| **Chair:** | **Prof. Zhigang Liu** | Southwest Jiaotong University, China | |
| | **Prof. Chunfa Zhao** | Southwest Jiaotong University, China | |
| **No.** | **Time** | **Panel List** | **Topic** |
| **1** | 18:00-18:15 | **Georg Schneider** University of Stuttgart | Simulation of a High-Speed Maglev Train on an Elastic Guideway of Infinite Length |
| **2** | 18:15-18:30 | **Danfeng Zhou** National University of Defense Technology | A Modeling Method for the Maglev Guideway Structures |
| **3** | 18:30-18:45 | **He Feng** Southwest Jiaotong University | Numerical Analysis of High-Speed Maglev Vehicle Dynamics Considering the Flexibility of Running Part |
| **4** | 18:45-19:00 | **Sumei Wang** The Hong Kong Polytechnic University | Experimental Study on Dynamic Performance of Medium and Low Speed Maglev Train Running on the Turnout |
| **5** | 19:00-19:15 | **Florian Dignath** Thyssenkrupp Transrapid | Computation of Maglev System Response by Transfer Functions |
| **6** | 19:15-19:30 | **Yiming Xue** Tongji University | Vibration Test and Analysis of Medium and Low Speed Maglev Switch |
| **7** | 19:30-19:45 | **Solomonov Yu.S.** Russian University of Transport | Transport System with Magnetic Unloading |
| **8** | 19:45-20:00 | **Yeye Peng** Southwest Jiaotong University | Numerical Analyses on Coupled Vibration Response Between the Medium-low Speed Maglev Vehicle and T-shaped Rigid Frame Bridge |
| **20:00-20:15** | | **Break** | |

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| **9** | 20:15-20:30 | **Patrick Schmid**<br>University of Stuttgart | Modeling of the Transrapid's Electromagnets and the Application to Large Mechatronic Vehicle Models |
| **10** | 20:30-20:45 | **Wanjing Wang**<br>CRRC Qingdao Sifang CO., LTD. | Carbody Design Research of 600 km/h High-speed Maglev Train |
| **11** | 20:45-21:00 | **Yang Feng**<br>Southwest Jiaotong University | Research on Dynamics of Medium-low speed Maglev train-track-curved girder |
| **12** | 21:00-21:15 | **Junhu Gong**<br>China Railway Maglev Transportation Investment and Construction CO., LTD. | Dynamic Characteristics of High-speed Maglev Separated Track Beam |
| **13** | 21:15-21:30 | **Yeye Peng**<br>Southwest Jiaotong University | Simulation analysis of coupled dynamic of medium - low speed Maglev train-track-girder with different stiffness |

## Session B: Control & Feedback Loop

| **18:00-21:30, 19. Oct. 2022** | | | **Meeting No.: 897 8286 1538** |
|---|---|---|---|
| **Chair:** | **Prof. Liming Shi** | Chinese Academy of Sciences, China | |
| | **Prof. Wei Xu** | Huazhong University of Science and Technology, China | |
| **No.** | **Time** | **Panel List** | **Topic** |
| **1** | 18:00-18:15 | **Linxiao Zhang**<br>National University of Defense Technology | The Research on Control Algorithm of Maglev Train Levitation System Based on Reinforcement Learning |
| **2** | 18:15-18:30 | **Jilong Liu**<br>CRRC Qingdao Sifang CO., LTD. | Research on Suspension Guidance Control Algorithm of High-speed Maglev Train |
| **3** | 18:30-18:45 | **Fengxing Li**<br>Tongji University | Suspension Control of Maglev Train Based on Extended Kalman Filter and Linear Quadratic Optimization |

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| **4** | 18:45-19:00 | **Yang Yang**<br>National University of Defense Technology | Research on the Method of Disturbance Rejection Caused by Railway Step Based on Active Disturbance Rejection Control |
| **5** | 19:00-19:15 | **Yu Jin**<br>Tongji University | The Influence of Aerodynamic Lift on High-Speed Maglev Levitation and Propulsion |
| **6** | 19:15-19:30 | **Tongtong Yu**<br>Sun Yat-sen University | Improved LADRC for Rotor System of Magnetic Levitation Turbomachinery |
| **7** | 19:30-19:45 | **Peichen Han**<br>Tongji University | Modeling and Control of Asymmetric Suspension Electromagnet for Medium-Low Speed Maglev Train |
| **8** | 19:45-20:00 | **Zhizhou Zhang**<br>Sun Yat-sen University | An AEFA-based Optimum Design of Fuzzy PID Controller for Attitude Control Flywheel with BLDC Motor |
| **20:00-20:15** | | **Break** | |
| **9** | 20:15-20:30 | **Zhixun Ma**<br>Tongji University | An Improved Overmodulation Strategy for a Three-level NPC Inverter Considering Neutral-point Voltage Balance and CMV Suppression in High-speed Maglev Application |
| **10** | 20:30-20:45 | **Zhixuan Su**<br>Hunan Rail Technology Application Research Center CO., LTD. | Modeling and Simulation of Single-point Hybrid Levitation System based on Active Disturbance Rejection Control |
| **11** | 20:45-21:00 | **Yuheng Ai**<br>Tongji University | Field Test and Study on Running Stability of Fenghuang Medium and Low Speed Maglev Train |
| **12** | 21:00-21:15 | **Siwei Cheng**<br>Huazhong University of Science and Technology | Improved Sliding-Mode Reaching Law for Speed Control of TPMLSM via Disturbance Observer |
| **13** | 21:15-21:30 | **Yawen Dai**<br>Tongji University | Performance Evaluation of Control Circuit of Electric Maglev System Based on Hurst Index |

## Session C: Development, Application & Related Topics

| 18:00-21:30, 19. Oct. 2022 | | | Meeting No.: 838 0294 8724 |
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| **Chair:** | **Mr. Michael Witt** | International Maglev Board, Germany | |
| | **Dr. Qinghua Zheng** | Thyssenkrupp Transrapid, Germany | |
| **No.** | **Time** | **Panel List** | **Topic** |
| **1** | 18:00-18:15 | **Akiho Onoue**<br>Osaka Institute of Technology | Verification of Levitation Attitude in Maglev Transport System Using only Linear Induction Motor |
| **2** | 18:15-18:30 | **Roland Kircher**<br>The International Maglev Board | Particulate Matter Emissions in Track-Bound High-Speed Transportation Systems |
| **3** | 18:30-18:45 | **Guimei Deng**<br>CRRC Qingdao Sifang CO., LTD. | Characteristic Analysis of an E-type Electromagnet for Maglev Train |
| **4** | 18:45-19:00 | **Henrik Ny**<br>Blekinge Institute of Technology | Is Maglev an Interesting Option for a Sustainable Scandinavian Transport Network? |
| **5** | 19:00-19:15 | **Xu Zhou**<br>National University of Defense Technology | Fault detection for Suspension System of Maglev Trains Based on Historical Health Data |
| **6** | 19:15-19:30 | **J.F. González-Rojo**<br>Zeleros Global SL. | Optimal Design of a Scaled Linear Switched Reluctance Motor for Hyperloop and Freight Forward Applications |
| **7** | 19:30-19:45 | **Qinfen Lu**<br>Zhejiang University | Iron Loss Analysis of Long-Stator Linear Synchronous Motor in High-Speed Maglev Train |
| **8** | 19:45-20:00 | **Eduardo David**<br>Newcastle University | EcoMaglev Infra Upcycling in Magnetic Levitation |
| **20:00-20:15** | | **Break** | |

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| **9** | 20:15-20:30 | **Yan Sun**<br>Shanghai DianJi University | Research on high-speed EMS Maglev in low pressure vacuum pipeline |
| **10** | 20:30-20:45 | **Xinmai Gao**<br>CRRC Qingdao Sifang CO., LTD. | Research on Short-circuit Fault of High-speed Maglev Traction Linear Motor |
| **11** | 20:45-21:00 | **Shmatchenko**<br>Association for the Promoting of Maglev Technologies (Transrapid) e.V. | Planning Process for the Implementation of Maglev Systems Using the Example of Maglev Logistic |
| **12** | 21:00-21:15 | **Shuai Liu**<br>CRRC Changchun Railway Vehicles Co.,Ltd. | Research Progress on Several Key Technologies of EDS in China |

# Poster Presentations

## Session P: Poster

| 18:00-21:30, 19. Oct. 2022 | | Meeting No.: 846 6561 6582 |
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| **No.** | **Panel List** | **Topic** |
| **1** | **Chen Chen**<br>Tongji University | Experimental Study on Vehicle Rail Magnetic Coupling Vibration Characteristics of Long Stator Medium Speed Maglev Train |
| **2** | **Ke Huang**<br>Tongji University | Application Analysis of Inverter Energy Feedback System |
| **3** | **Keting Hu**<br>Tongji University | Suspension Gap Synchronous Control of Medium-Low Speed Maglev |
| **4** | **Mingbo Liu**<br>Tongji University | Comparative Research on the Surface Temperature Effect of Low-Speed Maglev Steel and Concrete Box Girder |
| **5** | **Wanyu Tang**<br>Tongji University | Study on the Influence Factors of Substructure Deformation of Shanghai Maglev Line Due to Nearby Foundation Pits Excavation Based on Orthogonal Test |
| **6** | **Wenbai Zhang**<br>Tongji University | Research on Decentralized Control Handover Hierarchical CPN Modeling of 600km/h High-Speed Maglev Train |
| **7** | **Xiangyu Wu**<br>Tongji University | Study on the Surface Temperature Law of Steel Box Girder of Low-Speed Maglev System |
| **8** | **Guoqiang Wang**<br>Tongji University | Application of Comprehensive Technical Monitoring and Protection in Maglev Protection Zone |
| **9** | **Zhichao Zuo**<br>National University of Defense Technology | Robust Controller Design and Analysis for Guidance System of High-Speed Maglev Train |
| **10** | **Fei Zhou**<br>National University of Defense Technology | Analysis and Design of an Intelligent Operation and Maintenance System for Medium-Low Speed Maglev Trains |

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| **11** | **Fei Zhou**<br>National University of Defense Technology | Research on Thickness Detection of Current Collector Slide of Medium-Low Speed Maglev Trains Based on Image Processing |
| **12** | **Zi Mei**<br>National University of Defense Technology | Levitation System Condition Evaluation Method based on Weighted Hellinger Distance |
| **13** | **Shi Liang**<br>National University of Defense Technology | Simulation Analysis on the Track Adaptability of High Speed Maglev Train |
| **14** | **Tao Wen**<br>National University of Defense Technology | Study on Maglev Suspension Control Based on Data Driven Nonlinear Iterative Inversion |
| **15** | **Wentao Xia**<br>National University of Defense Technology | Modeling and Analysis of Electromagnetic Field of MSBS |
| **16** | **Baojun Chen**<br>National University of Defense Technology | Technical Analysis and Application of Permanent Magnet EDS Based on Halbach Structure |
| **17** | **Yongpan Hu**<br>National University of Defense Technology | Three-dimensional Modelling and Validation for the Ultra-high Speed EDS Rocket Sled with PM Halbach Array |
| **18** | **Miao Li**<br>Southwest Jiaotong University | Dynamic Response Analysis of Medium–low-speed Maglev Vehicle–bridge Coupled System Considering Levitation Failure |
| **19** | **Bo Wang**<br>Southwest Jiaotong University | Study on Dynamics Modeling of Two-Sided PM EDS Maglev System |
| **20** | **Hongfu Shi**<br>Southwest Jiaotong University | Experiment Analysis and Guideway Optimization of Permanent Magnets Eddy Current Brake Applied on HTS Maglev System |
| **21** | **Miao Li**<br>Southwest Jiaotong University | Dynamic Response Analysis of Medium–low-speed Maglev Vehicle–bridge Coupled System Considering Levitation Failure |
| **22** | **Peiyang Zeng**<br>Southwest Jiaotong University | Experimental Study on the Influence of Al Alloy Permanent Magnetic Guideway Enclosure on the Dynamic Performance of HTS Pinning Maglev System |

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| **23** | **Yuchen He**<br>Southwest Jiaotong University | Lateral Dynamic Performance of High-temperature Superconducting Pinning Maglev Vehicle Driven by Electrodynamic Wheel at Medium and Low Speed |
| **24** | **Yuxing Huang**<br>Southwest Jiaotong University | Multi-objective Parameter Optimization of Electromagnetic Shunt Damper for High-Temperature Superconducting Maglev Vehicle System |
| **25** | **Kehong Ren**<br>Southwest Jiaotong University | Experimental Study on Suspension System Based on Improved Double Closed-loop Control Strategy |
| **26** | **Jianbo Sun**<br>CRRC Qingdao Sifang CO., LTD. | Analysis and Eliminate of High order Harmonics in High speed Maglev Propulsion Converter System |
| **27** | **Yanxiao Lei**<br>CRRC Qingdao Sifang CO., LTD. | Development and Test Platform of High-Speed Maglev Tr action System Based On Physical Hardware In The Loop |
| **28** | **Donghua Wu**<br>CRRC Qingdao Sifang CO., LTD. | Study on High-Speed Maglev Headway Calculation and Auxiliary Stop Area Position Setting |
| **29** | **Yi Chang**<br>CRRC Qingdao Sifang CO., LTD. | The Application of Distributed Acoustic Sensing Technology in High-Speed Maglev Line Monitoring |
| **30** | **Shanqiang Fu**<br>CRRC Qingdao Sifang CO., LTD. | Modeling Analysis of High-speed Maglev Track Beam |
| **31** | **Shi Xiao**<br>CRRC Qingdao Sifang CO., LTD. | Design and Implementation of Communication Interface for Magnetic Field Monitoring Probe |
| **32** | **Xueqian Cao**<br>Chinese Academy of Sciences | An Improved High-speed Maglev Train Speed Sensorless Control in Double Feed Mode |
| **33** | **Yanxi Zheng**<br>Chinese Academy of Sciences | Sensorless Control Strategy for High-speed Maglev Based on a Nonlinear Flux Observer |
| **34** | **Yuying Zheng**<br>Zhejiang University | Coupling Modeling of Long Stator Linear Synchronous Motor of High-Speed Maglev Train |

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| **35** | **Qingshan Dou**<br>Hunan Rail Technology Application Research Center CO., LTD. | Research on Levitation Controller Fault Diagnosis Based on Bayesian Network |
| **36** | **Jun Yang**<br>CRRC Tangshan CO., LTD. | Research and Development of a 200kmh Medium Speed Maglev Train |
| **37** | **Yonggang Wang**<br>CRRC Tangshan CO. ,LTD. | Characteristic Analysis of Permanent Magnet Electromagnetic Hybrid Suspension Guidance System for Maglev Train |
| **38** | **Xiaoqing Li**<br>CRRC Changchun Railway Vehicels CO., LTD. | Influence of F-rail Plate width on Medium and Low Speed Maglev Vehicles |
| **39** | **Junhu Gong**<br>China Railway Maglev Transportation Investment and Construction CO. ,LTD. | Mechanical Properties of Composite Track Beam for Medium and Low Speed Maglev Transit |
| **40** | **Giovanni Lanzara**<br>University of L'Aquila | On the Suspension of the Experimental UAQ4 High-temperature Superconducting Maglev Train |