



Chongqing University

ERMR 2023

THE 18th INTERNATIONAL CONFERENCE ON ELECTORRHEOLOGICAL
FLUIDS AND MAGNETORHEOLOGICAL SUSPENSIONS

CONFERENCE PROGRAM

June 9-12, 2023 Chongqing, China





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Welcome Message

It is our great pleasure to invite you to attend the 18th International Conference on Electrorheological Fluids and Magnetorheological Suspensions (ERMR2023) in Kingworld Hotel Chongqing from 9 June (Friday) to 12 June (Monday) 2023.

The ERMR2023 covers science and technologies relevant to electro-responsive (ER) and magneto-responsive (MR) materials. Its overall scope spans basic science and materials to engineering applications. The technical presentations of the conference will be organized into a single oral session and a poster session where all attendees can exchange ideas in a relaxed atmosphere. Researchers, practitioners and students are welcome to present and discuss their latest research and innovations.

Authors who present papers at the ERMR2023 conference are encouraged to submit quality journal papers to special issues to be organized in Journal of Intelligent Material Systems and Structures or Smart Materials and Structures or Modern Physics Letter B. Such submissions will be considered following the usual review procedures of each journal to ensure that papers meet scope and quality requirements for the journals.

June 2023

Miao Yu, Chongqing University

Chairman of ERMR2023



About ERM 2023

◆ Introduction

The ERM2023 covers science and technologies relevant to electro-responsive (ER) and magneto-responsive (MR) materials. Its overall scope spans basic science and materials to engineering applications. The technical presentations of the conference will be organized into a single oral session and a poster session where all attendees can exchange ideas in a relaxed atmosphere. Researchers, practitioners and students are welcome to present and discuss their latest research and innovations.

◆ Details

Conference date: June 9-12, 2023

Conference Venue: Kingworld Hotel Chongqing (重庆君豪大饭店)

Host:

Chongqing University

Co-Host:

University of Science and Technology of China

Chinese Society of Theoretical and Applied Mechanics

Organizer:

College of Optoelectronic Engineering, Chongqing University

Key Laboratory of Optoelectronic Technology & Systems, Ministry of Education (Chongqing University)

CAS Key Laboratory of Mechanical Behavior and Design of Materials (University of Science and Technology of China)

Chinese Society of Theoretical and Applied Mechanics, Chinese Society of Rheology

Sponsors:

Anhui Weiwei Rubber Parts Group Co.Ltd.

Anton Paar China

UPWARDTECH

Shenzhen Bohai New Materials Technology Co.,Ltd.

◆ Contact

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ERMR2023 Organizing Committee

◆ Honorary Chairman of Organizing Committee

Prof. Jinjun Zhang (China University of Petroleum Beijing, China)

◆ Chairman of Organizing Committee

Prof. Miao Yu (Chongqing University, China)

◆ Co—Chairman of Organizing Committee

Prof. Xinglong Gong (University of Science and Technology of China, China)

◆ International Organizing Committee

Dr. Daniel Barber, Lord Corporation, USA

Dr. Holger Boese, Fraunhofer Institute, Germany

Prof. Antonio Jose Faria Bombard, Federal University of Itajubá, Brazil

Prof. Georges Bossis, University of Nice, France

Prof. Andrejs Cebers, Institute of Physics, Latvia

Prof. Hyoungh Jin Choi, Inha University, Korea

Prof. Seung-Bok Choi, The State University of New York (SUNY Korea), Korea

Prof. Juan de Vicente, University of Granada, Spain

Prof. Fernando Gonzalez-Caballero, University of Granada, Spain

Prof. Faramarz Gordaninejad, University of Nevada, Reno, USA

Prof. Daniel J. Klingenberg, University of Wisconsin, Madison, USA

Prof. William Kordonski, QED Technologies Inc., USA

Prof. Evguenia Korobko, A. V. Lykov Heat and Mass Transfer Institute, Belarus

Prof. Weihua Li, University of Wollongong, Australia

Prof. Kunquan Lu, Chinese Academy of Science, China

Prof. James E. Martin, Sandia National Laboratory, USA

Prof. Masami Nakano, Tohoku University, Japan

Prof. Stefan Odenbach, Technische Universität, Dresden, Germany

Prof. Rongjia Tao, Temple University, USA

Prof. Halil Ibrahim Unal, Gazi University, Turkey

Dr. Xiaojie Wang, Chinese Academy of Science, China

Prof. Weijia Wen, Hong Kong University of Science and Technology, China

Prof. Norman M. Wereley, University of Maryland, USA

Prof. Miao Yu, Chongqing University, China

Prof. Xiaopeng Zhao, Northwestern Polytechnical University



Prof. Andrey Zubarev, Ural Federal University, Russia

Prof. Jianbo Yin, Northwest Polytechnic University, China

Prof. Xufeng Dong, Dalian University of Technology, China

◆ Local Organizing Committee

Prof. Jie Fu (Chongqing University, China)

Prof. Xiaomin Dong (Chongqing University, China)

Prof. Huaxia Deng (University of Science and Technology of China, China)

Prof. Shuaishuai Sun (University of Science and Technology of China, China)

Assoc. Prof. Song Qi (Chongqing University, China)

Assoc. Prof. Sheng Wang (University of Science and Technology of China, China)

Assoc. Pro. Hao Zhang (Chongqing University of Science and Technology, China)

Assoc. Pro. Pingan Yang (Chongqing University of Posts and Telecommunications, China)

Dr. Lei Luo (Chongqing University, China)

Dr. Mi Zhu (Chongqing University of Technology, China)

Dr. Lirui Wang (Chongqing University of Science and Technology, China)

Plenary Speakers



Prof. Seung-Bok Choi

The State University of New York (SUNY Korea), Korea.

Fellow of Korea Science and Technology Academy; Fellow of National Academy of Engineering of Korea, Director of Smart Structures and Systems Laboratory, the chief editor and associate editor of *Frontiers in Materials-Smart Material*, *Current Smart Materials*, *Scientific Report*, *Smart Materials and Structures*, *Journal of Intelligent Material Systems and Structures*, *Sensors*, and *Advances in Mechanical Engineering*.



Prof. Norman M. Wereley

University of Maryland, USA.

Director, Composites Research Laboratory (CORE), InnoVital Systems Faculty Fellow, Senior Member of IEEE. The recipient of the ASME Adaptive Structures and Material Systems Prize (2012) and the SPIE Smart Structures and Materials Lifetime Achievement Award (2013). Norman M. Wereley



Prof. Rongjia Tao

Temple University, USA.

Fellow of American Physical Society, Editor in chief for *Modern Physics Letter B* and *International Journal of Modern Physics B*. Distinguished Award for Excellence in Research from Temple University. Albert Nelson Marquis Lifetime Achievement Award by Marquis Who's Who, SIUC Outstanding Scholar Award.



Prof. Kunquan Lu

Chinese Academy of Science, China.

Researcher, Institute of Physics, Chinese Academy of Sciences. Formerly the director of the Crystal Room at the Institute of Physics, Deputy Director of the Academic Committee of the Institute of Physics, and Director of the Academic Committee of the Soft Matter Physics Laboratory. He has been awarded the Second Prize for Scientific and Technological Progress of the Chinese Academy of Sciences, the Second Prize for Natural Science, and the Second Prize for National Scientific and Technological Progress.



Prof. Juan de Vicente

Granada University, Spain.

Member of the Executive Committee of the Spanish Society of Rheology (GER) and the Spanish Colloids and Interfaces Group (GECI) (from RSEF & RSEQ).

Head of the Magnetic Soft Matter Group

Director of the Singular Laboratory in Advanced Technologies F2N2Lab.

**Prof. Masami Nakano***Tohoku University, Japan.*

Fellow of the JSME and the JABEE, Director of the Japan Fluid Power Systems Society (JFPS) and Chairman of JFPS Research Committee on “Fluid Power Systems utilizing Functional Fluids”.

**Prof. Weihua Li***Wollongong University, Australia.*

Director, Advanced Manufacturing Research Center, University of Wollongong, Australia; Fellow of Engineers Australia, Fellow of the Institute of Physics (UK).

**Prof. Decai Li***Tsinghua University, China.*

Deputy Director of the State Key Laboratory of Tribology, at Tsinghua University, China. He has been awarded provincial and ministerial awards including the second prize of National Technology Invention Award, Outstanding Achievement in Scientific Research of Colleges and Universities, the first prize of Science and Technology in Beijing.

**Prof. Xinglong Gong***University of Science and Technology of China, China.*

Director of CAS Key Laboratory of Mechanical Behavior and Design of Materials, Chief Editor of Chinese Journal of Experimental Mechanics, council member of Chinese Society of Theoretical and Applied Mechanics, Executive Vice Chairman of Vibration Engineering Society of Anhui Province.

**Prof. Miao Yu***Chongqing University, China.*

Director of Magnetorheological Research Center, Chongqing University. Top 2% of the world's top scientists for academic contributions to intelligent structures and vibration control; Highly Cited Chinese Researchers in 2020 and 2021. He has been awarded seven provincial and ministerial awards including the first prize of Chongqing Science and Technology Progress.

Conference Venue

◆ Conference Venue

Kingworld Hotel Chongqing (重庆君豪大饭店)

◆ Address

No. 9, Jinyuan Road, Jiangbei District, Chongqing

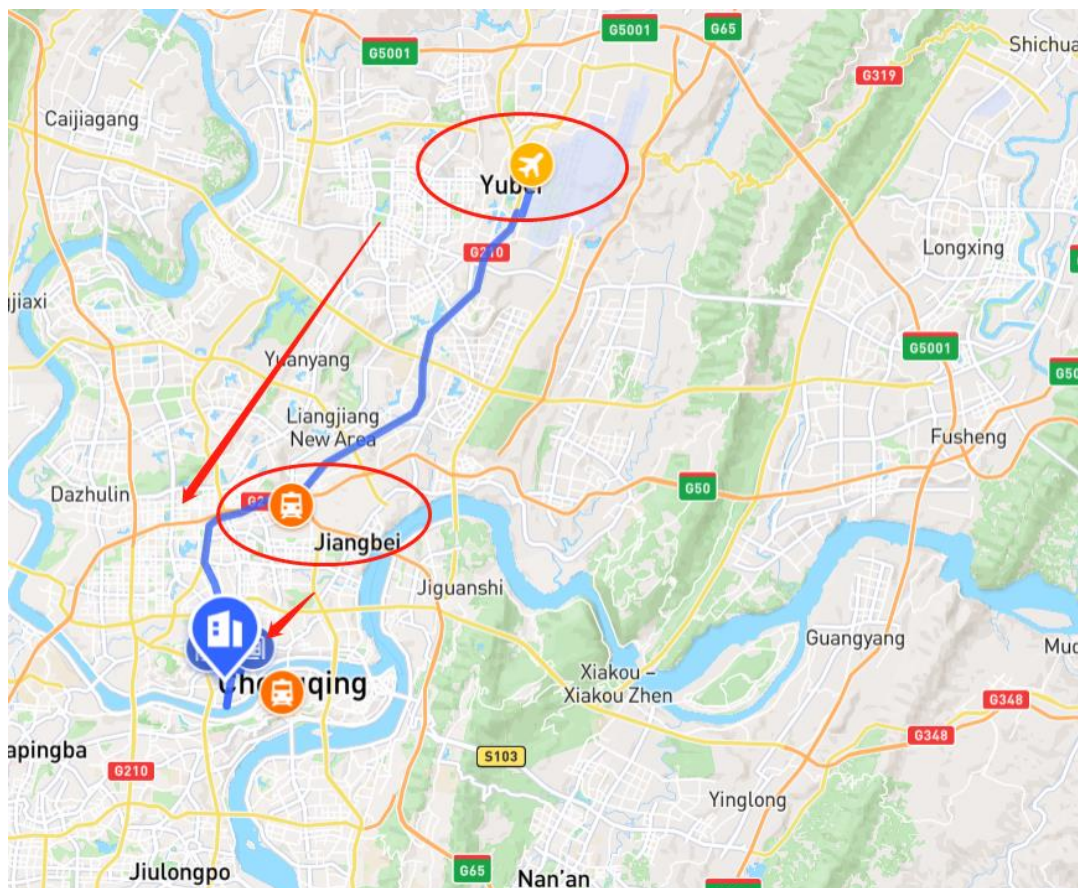
◆ Transportation to Kingworld Hotel

Chongqing Jiangbei International Airport:

- ▶ Public transport: From Jiangbei International Airport Subway Line 3 transfer to Bus 844 /816/127/630 (about 1h 30min);
- ▶ Taxi: The distance between Chongqing Jiangbei International Airport and Kingworld Hotel is around 27km, the expense is about 60 yuan. (about 40 min).

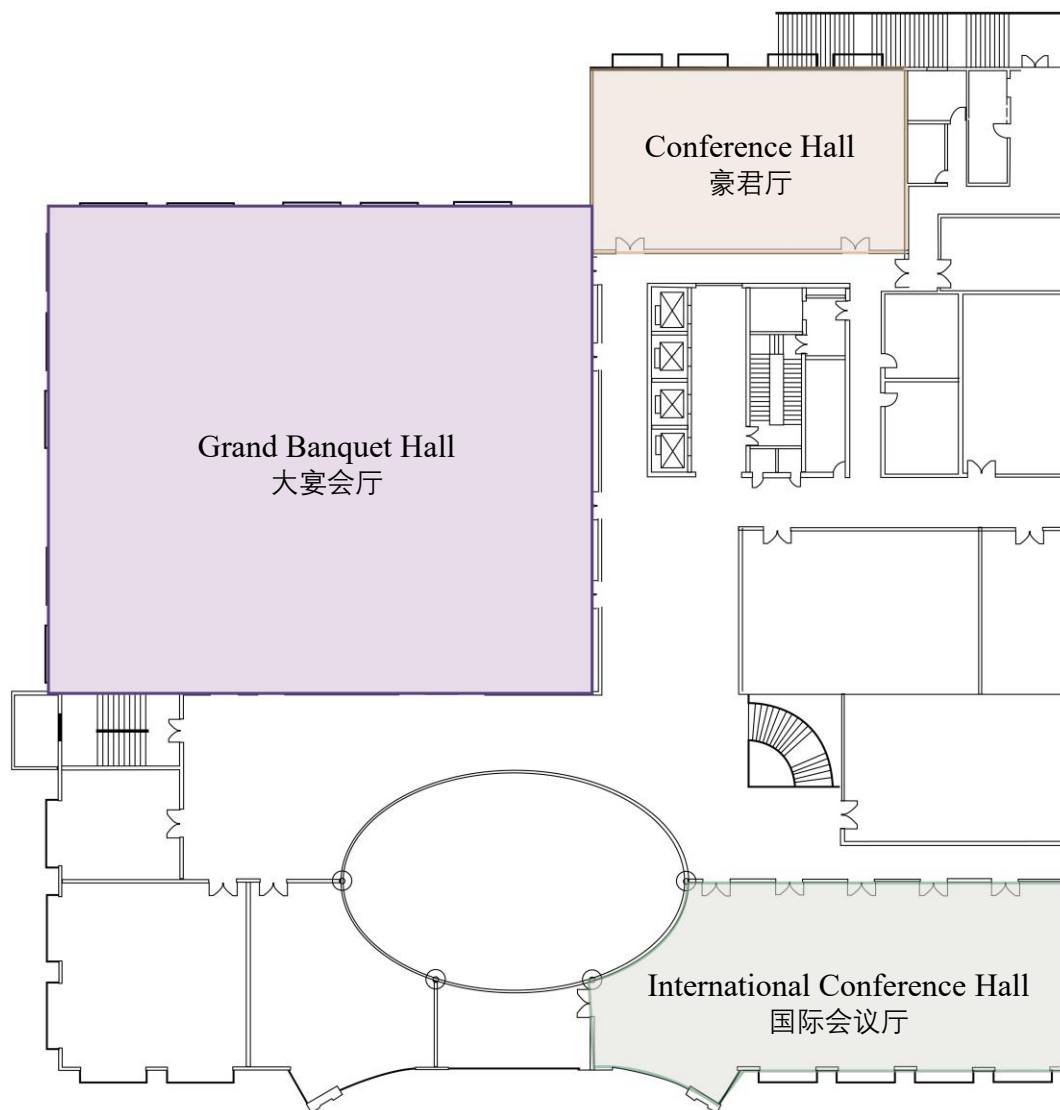
Chongqing Jiangbei North Station:

- ▶ Public transport: From Jiangbei North Station Line 10 transfer to Line 9 (about 50min);
- ▶ Taxi: It's around 9km between Chongqing North Station and Kingworld Hotel, and it takes about 20 yuan. (about 25m)





◆ Conference Site Distribution





Agenda

Time		Contents	Place
8 th June	10:00-22:00	Registration	Hotel Lobby
	18:00-19:30	Buffet Dinner	Hotel Buffet
9 th June	07:30-12:00	Registration	Hotel Lobby
	08:30-09:30	Opening Ceremony	Grand Banquet Hall
	09:30-09:50	Group Photo	
	09:50-10:50	Plenary Lecture	
	10:50-11:00	Tea Break	——
	11:00-12:10	Concurrent Session 1-1	International Conference Hall
		Concurrent Session 2-1	Conference hall
	12:10-13:30	Buffet Lunch	Hotel Buffet
	14:00-15:40	Concurrent Session 1-2	International Conference Hall
		Concurrent Session 2-2	Conference hall
	15:40-16:00	Tea Break	——
	16:00-18:00	Concurrent Session 1-3	International Conference Hall
		Concurrent Session 2-3	Conference hall
	18:00-19:30	Buffet Dinner	Hotel Buffet
	18:00-21:00	ERMRS 2023 International Organizing Committee Meeting	Huangge Evening Breeze & Jiangjing Family Banquet
10 th June	08:30-09:30	Plenary Lecture	International Conference Hall
	09:30-10:15	Tea Break	——
	10:15-12:10	Concurrent Session 1-4	International Conference Hall
		Concurrent Session 2-4	Conference hall
	12:10-13:30	Buffet Lunch	Hotel Buffet
	14:00-15:10	Concurrent Session 1-5	International Conference Hall
		Concurrent Session 2-5	Conference hall
	15:10-15:40	Plenary Lecture	International Conference Hall
	12:00-15:40	Poster	Grand Banquet Hall
	15:40-20:30	City Tour & Banquet	Two Rivers Cruise



Time		Contents	Place
11 th June	08:30-10:00	Plenary Lecture	International Conference Hall
	10:00-10:15	Tea Break	——
	10:15-12:10	Concurrent Session 1-6	International Conference Hall
		Concurrent Session 2-6	Conference hall
	12:10-13:30	Buffet Lunch	——
	14:00-15:40	Concurrent Session 1-7	International Conference Hall
		Concurrent Session 2-7	Conference hall
	15:40-16:00	Tea Break	——
	16:00-18:00	Concurrent Session 1-8	International Conference Hall
		Concurrent Session 2-8	Conference hall
	18:00-19:30	Banquet & Sichuan Opera show	Grand Banquet Hall
12 th June	08:30-09:30	Plenary Lecture	Grand Banquet Hall
	09:30-10:00	Tea Break	——
	10:00-11:00	Closing Ceremony and Award Ceremony	Grand Banquet Hall
	12:10-13:30	Buffet Lunch	Hotel Buffet
	14:00-18:00	A trip to Chongqing Zoo and watch pandas, Yangtze River Cableway	——
	18:00-19:30	Buffet Dinner	Hotel Buffet
13 th June	08:30-19:30	A trip to Wulong Karst tourist area(fee: about US\$61/per person)	——
	08:30-19:30	A trip to Dazu Rock Carving & Mount Baoding(fee: about US\$52/per person)	——



The latest schedule is based on the online schedule



Program

Day 0 Thursday, 8th June 2023

Kingworld Hotel (Hotel Lobby)

10:00-22:00

Registration

Kingworld Hotel (Hotel Buffet)

18:00-19:30

Buffet Dinner

Day 1 Friday, 9th June 2023

Kingworld Hotel (Conference Reception Desk)

07:30-12:00

Registration

Kingworld Hotel (Grand Banquet Hall)

08:30-09:30

Opening Ceremony

09:30-09:50

Group Photo

Kingworld Hotel (Grand Banquet Hall)

09:50-10:50

Plenary Lecture

Session Chair: Prof. Weihua Li

09:50-10:20

Plenary: Design of a new rotary MR damper for suspension system of purpose-built vehicles

Prof. Seung-Bok Choi

The State University of New York (SUNY Korea), Korea, South Korea

10:20-10:50

Plenary: Reducing global warming and mitigating PM2.5 air pollution with electrorheology

Prof. Rongjia Tao

Temple University, USA

10:50-11:00

Tea Break

*Kingworld Hotel (International Conference Hall)*

11:00-12:10	
Concurrent Session 1-1: MRF material and device	
Session Chair: Prof. Shuaishuai Sun	
11:00-11:20	Invited: Temperature-dependent behavior of shear thickening fluids in normal compression tests Tongfei Tian University of the Sunshine Coast, Australia
11:20-11:40	Invited: Rheological characteristics of MR materials and its applications under high impact load. Jiong Wang Nanjing University of Science and Technology, China
11:40-11:55	Oral: Rheometer design to investigate abrasive magnetorheological fluids Fabian Sordon, Valentin Schreiner, Jürgen Maas Technical University of Berlin, Germany
11:55-12:10	Oral: Evaluation of open-loop torque performance of haptic MR fluid clutch Asaka Ikeda Oita University, Japan

Kingworld Hotel (Conference hall)

11:00-11:55	
Concurrent Session 2-1: ER material and device	
Session Chair: Prof. Calis-Ismetoglu Gokce, Prof. Luning Xu	
11:00-11:20	Invited: A highly stretchable self-healing composite with tunable stiffness Xufeng Dong Dalian University of Technology, China
11:20-11:40	Invited: A novel configuration of ER valves with mesh electrodes Luning Xu Institute of Electrical Engineering, Chinese Academy of Sciences University of Chinese Academy of Sciences, China
11:40-11:55	Oral: Multiphysics modeling and simulation of optically controlled variable damping system based on PLZT/ER Yao Yao Nanjing University of Science and Technology, China

Kingworld Hotel (Hotel Buffet)

12:10-13:30
Buffet Lunch

*Kingworld Hotel (International Conference Hall)***14:00-14:50****Concurrent Session 1-2: MRF material and device****Session Chair: Prof. Jiong Wang**

14:00-14:15	Oral: Enhancing rheological properties and sedimentation stability of magnetorheological fluids with soft and hard magnetic nanoparticles Kacuk Cikal Nugroho Universitas Sebelas Maret, Indonesia
14:15-14:30	Oral: Properties of Fe-Co nanoparticles based magnetorheological fluids Tianxiang Du Dalian University of Technology
14:30-14:50	Oral: A lab-made capillary magneto-rheometer for viscosity characterization Mingfu Wen Shantou University, China

*Kingworld Hotel (Conference hall)***14:00-15:25****Concurrent Session 2-2: ER and MR material****Session Chair: Prof. Tongfei Tian**

14:00-14:20	Invited: High-performance giant electrorheological elastomers and their applications Jinbo Wu Shanghai University, China
14:20-14:40	Invited: Electrorheological behavior of polysaccharide suspensions in silicon oil. The effect of filler shape Nikita M. Kuznetsov National Research Center "Kurchatov Institute", Russia
14:40-14:55	Oral: Combined methods for investigation of electro- and magneto-rheological fluids Jan Haeberle Anton Paar Germany GmbH, Germany
14:55-15:10	Oral: Carbon nanomaterial-based ER fluids and their stimuli-responsive properties Ke Zhang Harbin Institute of Technology, China
15:10-15:25	Oral: The integrated bingham model of liquid and near solid state considering the percentage of silicone oil in magnetorheological fluid Jun Xi Yantai University, China

15:25-16:00**Tea Break***Kingworld Hotel (International Conference Hall)***16:00-17:25****Concurrent Session 1-3: MRF device and application****Session Chair: Prof. Shiwei Chen, A. Prof. Hui Huang**



16:00-16:20	Invited: Comparative studies of semi-active control algorithms on a full vehicle with magnetorheological dampers Yancheng Li University of Technology Sydney, Australia
16:20-16:40	Invited: Vibration control of semi-active seat suspension with magnetorheological damper-based controllable inerter Donghong Ning Ocean University of China, China
16:40-16:55	Oral: Research on anti-shock control of magneto-rheological damper and hydraulic actuator with impedance-resistance coupling Baizhou Ma Fuzhou University, China
16:55-17:10	Oral: Development of an improved base isolation system with semi-active inerter and MR technology for seismic events suppression Shida Jin University of Wollongong, Australia
17:10-17:25	Oral: Establishment of mechanical model and experimental verification of a novel asymmetric magnetorheological damper Huijun Liang Chongqing University, China

*Kingworld Hotel (Conference hall)***16:00-17:25****Concurrent Session 2-3: ER and MR application****Session Chair: Prof. Xufeng Dong**

16:00-16:20	Invited: Electric treatment for improving cold flowability of crude oil Hongying Li China University of Petroleum, Beijing
16:20-16:40	Invited: Design and performance of shear-squeeze mixed mode electrorheological elastomer isolator Chenguang Niu Taiyuan University of Technology, China
16:40-16:55	Oral: Study on polishing and mechanical properties of Magnetorheological polishing fluid with shear thickening effect Xiang Min Guangdong University of Technology, China
16:55-17:10	Oral: Design and optimization of a magnetically controlled spherical gripper Wulin Qin Chongqing University of Posts and Telecommunications, China
17:10-17:25	Oral: Controllable tribological properties of magnetorheological rubber Rui Li Chongqing University of Posts and Telecommunications



Kingworld Hotel (Grand banquet hall)

18:00-19:30

Buffet Dinner

Huangge Evening Breeze & Jiangjing Family Banquet

18:00-21:00

ERMR 2023 International Organizing Committee



Day 2 Saturday, 10th June 2023

Kingworld Hotel (International Conference Hall)

08:30-09:30

Plenary Lecture

Session Chair: Prof. Seung-Bok Choi

08:30-09:00	Plenary: Induced dipole-dominated ER (ID-ER) effect — A new type of giant ER fluid Prof. Kunquan Lu Chinese Academy of Science, China
09:00-09:30	Plenary: Sensing capability of a new liquid metal magnetorheological elastomer Prof. Weihua Li University of Wollongong, Australia

09:30-10:15

Tea Break

Kingworld Hotel (International Conference Hall)

10:15-11:40

Concurrent Session 1-4: MRF material and application

Session Chair: Prof. Yancheng Li, Prof. Xinjie Wang

10:15-10:35	Invited: Study on electro-fenton magnetorheological tribological behavior of the third generation semiconductor wafer Jisheng Pan Guangdong University of Technology, China
10:35-10:55	Invited: Monitoring sedimentation of magnetorheological fluids using an in-situ visual monitoring system with a wide-angle lens Chen Shiwei Chongqing University of Science & Technology, China
10:55-11:10	Oral: Coarse-grained modeling and simulation of magnetorheological fluids Penghui Zhao Dalian University of Technology, China
11:10-11:25	Oral: Scanning measurement of magnetorheological fluid sedimentation process via laser transmission intensity method Zhiyuan Zou Chongqing University, China
11:25-11:40	Oral: Study on the improved magnetic-controlled adhesion performance of modified magnetorheological elastomer Di Wang Chongqing University, China

*Kingworld Hotel (Conference Hall)*

10:15-11:55	
Concurrent Session 2-4: ER and MR material and application	
Session Chair: Prof. Nikita Kuznetsov, Prof. Bo-Gyu Kim	
10:15-10:35	Invited: A giant electrorheological polishing fluid based on TiO ₂ inlaid with nanocarbons and its application in precision polishing Xiaomin Xiong Sun Yat sen University, China
10:35-10:55	Invited: Preparing smart magnetorheological foam and designing multifunctional devices Sheng Wang University of Science and Technology of China, China
10:55-11:10	Oral: A novel semiactive damping system featuring magnetorheological elastomer sandwich valve Kacuk Cikal Nugroho, Seung Bok Choi, Purwadi Joko Widodo, Didik Djoko Susilo, Bhre Wangsa Lenggana Universitas Sebelas Maret, Indonesia
11:10-11:25	Oral: Magnetorheological shear thickening gel reinforced iron-nickel foam composites with tunable energy absorption performance Yaping Li Chongqing University, China
11:25-11:40	Oral: Magnetorheological elastomer for enhancing the performance of triboelectric nanogenerator Ruixue Sun Chongqing University, China
11:40-11:55	Oral: Nonlinear dynamic model of isotropic soft magnetorheological elastomer and exploring the application in magnetic actuation Bochao Wang University of Science and Technology of China, China

Kingworld Hotel (Hotel Buffet)

12:10-13:30
Buffet Lunch

*Kingworld Hotel (International Conference Hall)***14:00-14:55****Concurrent Session 1-5: MRF device****Session Chair: Prof. Bo-Gyu Kim**

14:00-14:20	Invited: Performances of planetary magnetorheological transmission devices Xuli Zhu Shandong University of Science and Technology, China
14:20-14:40	Invited: Leaping to “active” with no more cost than “semi-active” – Concept of pseudo-active actuators: Principle, tests, and control Xianxu Bai Hefei University of Technology, China
14:40-14:55	Oral: A novel trajectory prediction approach for the active magnetorheological fluid bearing-rotor system based on VMD-IGWO-LSTM Peng Lai China University of Mining and Technology, China

*Kingworld Hotel (Conference Hall)***14:00-15:05****Concurrent Session 2-5: MRE device and application****Session Chair: Prof. Xinjie Wang**

14:00-14:20	Invited: Innovative magnetorheological joints and their applications on robots Shuaishuai Sun University of Science and Technology of China, China
14:20-14:35	Oral: Magnetorheological-based tuned mass damper for vibration mitigation of monopile offshore wind turbine Shikun You Ocean University of China, China
14:35-14:50	Oral: The investigation of an MRE isolator with low frequency bandgap based on acoustic metamaterial structure and inerters Zexin Chen University of Wollongong, Australia
14:50-15:05	Oral: Preset current control method for magnetorheological energy absorbers under impact excitation Yonghao Zhang Chongqing University, China

*Kingworld Hotel (International Conference Hall)***15:10-15:40****Plenary Lecture****Session Chair: Prof. Seung-Bok Choi**

15:10-15:40	Plenary: Magnetorheology under homogeneous shearing flows and saturating magnetic fields Prof. Juan de Vicente University of Granada, Spain
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Kingworld Hotel (Grand Banquet Hall)

12:00-15:40

Poster

- | | |
|----|--|
| 1 | Electrorheological behavior of boric acid doped magnetic and conducting ni-ferrite/ chitosan biocomposite
Halil Ibrahim UNAL, Gokay Karakaya, Mehmet Cabuk, Gokce Calis Ismetoglu
Gazi University, Turkey |
| 2 | Electrorheological properties of boron containing polyionic liquids
Halil Ibrahim Unal, Gokce Calis-Ismetoglu, Sevki Can Cevher
Gazi University, Turkey |
| 3 | Emergent dynamics and biomimetic 3D structures using magnetorheological materials
Guillermo Camacho, Matthew Terkel, Óscar Martínez-Cano, Jose R. Morillas, Stefania Nardecchia, Alejandro Rodriguez-Barroso, Fernando Vereda, Jose Antonio Ruiz-Lopez, Juan de Vicente
University of Granada, Spain |
| 4 | High performance anisotropic giant electrorheological elastomer and its application in smart table tennis racket
Jinbo Wu, Dongyang Huang
Shanghai University, China |
| 5 | Viscoelastic magneto-mechanical modelling for off-axis anisotropic magnetorheological elastomer with tilt magnetic chain
Zhaobo Chen, Leizhi Wang
Harbin Institute of Technology, China |
| 6 | Characterization of magnetic-dependent mullins effect and nonlinear viscoelasticity of magnetorheological elastomer
Yan Li, Bochao Wang, Xinglong Gong
University of Science and Technology of China, China |
| 7 | Constitutive modeling of isotropic magnetorheological elastomer: modulus magnetic stiffening and magnetic dependent nonlinear dynamic behavior
Jinyu Yang, Bo Chao Wang, Xinglong Gong
University of Science and Technology of China, China |
| 8 | Novel magnetorheological elastomer integrated multilayered composites towards electrothermal and magneto-actuating applications
Wenwen Li, Xinglong Gong
University of Science and Technology of China, China |
| 9 | Development of an anti-vibration aircraft model support system with magnetorheological dampers for wind tunnel test
Wang Li, Jie Fu, Miao Yu
Chongqing University, China |
| 10 | Attenuation of magneto-induced yield stress by magnetic carrier liquid in magnetorheological fluids
Shixu Li, Song Qi, Jie Fu, Miao Yu
Chongqing University, China |

11	Control of vibrations of elements of autonomous objects under external dynamic influences Evgenia Korobko, Vladimir Kuzmin, Inga Kharlamova A. V. Luikov Heat and Mass Transfer Institute of NAS of Belarus, Belarus
12	Effect of electric fields on the rheological properties of fluids based on complex oxide compounds Evgenia Korobko, Inga Kharlamova, Leonid Makhnach, Alexandra Usenka A. V. Luikov Heat and Mass Transfer Institute of NAS of Belarus, Belarus
13	Relaxation processes in rheological fluids under the influence of a magnetic field Evgenia Korobko, Mikalai Zhuravski, Liudmila Radkevich A. V. Luikov Heat and Mass Transfer Institute of NAS of Belarus, Belarus
14	A controllable MR tactile device using magnetic responsive materials for normal force and dynamic motion Seung-Bok Choi, Yu-Jin Park, En-Sang Lee, Bo-Gyu Kim The State University of New York, Korea (SUNY Korea), South Korea
15	Development of a three-dimensional force feedback system using magnetorheological fluid brakes for welding instruction Ryunosuke Sawahashi, Minoru Oba, Manabu Okui, Taro Nakamura Chuo University, Japan
16	Development of fail-safe magnetorheological fluid device using electro and permanent magnet Takehito Kikuchi, Rihito Fukuyama, Isao Abe Oita University, Japan
17	Impulse force presentation during ball kicking by lower limb exoskeleton with MR fluid brake (Online) Taiga Shimizu, Taiki Masuda, Ryunosuke Sawahashi, Manabu Okui, Rie Nishihama, Taro Nakamura Chuo University, Japan
18	Verification of assistive strategy with variable viscosity using exoskeleton device with MR brake in seated motion (Online) Yusuke Shimoda, Ryunosuke Sawahashi, Tetsuhito Fujita, Manabu Okui, Rie Nishihama, Taro Nakamura Chuo University, Japan
19	Presentation of sensation of knee movement in water with a lower limb exoskeleton using magnetorheological fluid brakes (Online) Ryunosuke Sawahashi, Taiki Masuda, Taiga Shimizu, Rie Nishihama, Manabu Okui, Taro Nakamura Chuo University, Japan
20	Study on adjustable natural frequency of 3D-printed magnetorheological elastomer Bing Chen, Rui Wu, Zhijun Zhao, Zhiyang Niu Northwestern Polytechnical University, China
21	Active dispersing simulation of the settled magnetorheological fluid and the experimental verification with concentration sensing Honghui Zhang, Minghui Zhu, Zhiyuan Zou Chongqing University, China

22	High-performance giant electrorheological material prepared based on btru@cds nanoparticles Jinbo Wu, Yubing Han Shanghai University, China
23	Research on braking torque model of magneto-rheological brake based on temperature effect Wanli Song Northeastern University, China
24	Dynamic viscoelastic and magnetic response property of tough nanocomposite hydrogel Wen Jiao Han, Hyoung Jin Choi Nanjing University of Science and Technology, China
25	Developing a strain-sensing string for self-sensing twisted string actuators using conductive polymer composites Xiaojie Wang, Chanchan Xu, Shuai Dong, Jingwei Zhan, Yifan Ma Chinese Academy of Sciences, China
26	Flexible tactile sensing of magnetic hydrogel composites based on electrical impedance tomography Xiaojie Wang, Bin Li, Xuanxuan Yang, Haofeng Chen Chinese Academy of Sciences, China
27	An electrorheological elastomer based on TiO_2 inlaid with nanocarbons and natural rubber Xiaomin Xiong, Zhaohui Qiu, Kunquan Lu, Rong Shen Sun Yat sen University, China
28	Core-shell structured magnetite-poly (diphenylamine) microspheres and their tunable dual response under magnetic and electric fields Yuzhen Dong Harbin Institute of Technology at Weihai, China
29	Enhanced electrorheological effect of suspensions based on co-poly (ionic liquid) s neutralized with mixed counterions Dong Yuezheng Qilu University of Technology, China
30	Magnetorheological elastomer-based composite with mechanically sensitive conductivity and magnetic-mechanical monitoring performance Min Sang, Xinglong Gong University of Science and Technology of China, China
31	Design, modeling and testing of a magnetorheological device with variable damping and variable inertance Jianqiang Yu, Jiawei Yin, Xuan Wu, Shiwei Chen China Nanhu Academy of Electronics and Information Technology, China
32	Reconstructing the magnetic hysteretic behaviour of dual coil MR actuators Lei Tang, Janusz Goldasz, Wojciech Bańkosz University of Girona, Spain



33	The effect of ions doping on the temperature-dependence magnetism of ferrite nanoparticles and ferrofluids Fang Chen, Zhaoqiang Yan, Zhenggui Li Xihua University, China
34	Algorithms design of gait data-driven magnetorheological bionic buffer collaborative transmission system for exoskeleton robots Hongzhan Lv, Hai Yang, Wei Huang Donghua University, China
35	Experimental study of damping characteristics of magnetorheological torsional vibration damper shaft system Zhicheng Wang, Ouyang Qing Jiaxing University, China
36	BiLSTM-SAM: A deep learning hybrid model for predicting hysteretic characteristics of magnetorheological elastomer isolator Mi Zhu, Yilin Yao, Hanguang Xiao, Miao Yu Chongqing University of Technology, China Chongqing University, China
37	Adaptive design of magnetorheological fluid-based upper limb rehabilitation supple joint Ouyang Qing, Ganglin Li Jiaxing University, China
38	A novel design of rotary MR damper Byung-Hyuk Kang, Bo-Gyu Kim Inha University, South Korea
39	Periodic magnetically oriented gradient structures for improving microwave absorption efficiency Lirui Wang, Miao Yu, Hao Zhang Chongqing University of science and technology, China Chongqing University, China

15:40-20:30**Banquet & City Tour**



Day 3 Sunday, 11th June 2023

Kingworld Hotel (International Conference Hall)

08:30-10:00

Plenary Lecture

Session Chair: Prof. Juan de Vicente

08:30-09:00	Plenary: Development and implementation of MR fluid clutch of 400 Nm class for driving axial pump Prof. Masami Nakano Tohoku University, Japan
09:00-09:30	Plenary: Prof. Norman M. Wereley University of Maryland, USA
09:30-10:00	Plenary: Rheological properties and applications of magnetic fluids Prof. Decai Li Tsinghua University, China.

10:00-10:15

Tea Break

Kingworld Hotel (International Conference Hall)

10:15-11:40

Concurrent Session 1-6: MRF device and application

Session Chair: Prof. Xuli Zhu, Prof. Xiaomin Dong

10:15-10:35	Invited: Dual-mode soft actuators with electrothermal and magneto-responsive performance Shouhu Xuan University of Science and Technology of China, China
10:35-10:55	Invited: Controllable synthesis and electromagnetic properties of magnetic particles Ping-an Yang Chongqing University of Posts and Telecommunications, China
10:55-11:10	Oral: Mechanism and experimental study of photocatalysis-electro fenton composite magnetorheological polishing Zhijun Chen Guangdong University of Technology, China
11:10-11:25	Oral: Structural design and control of lumbar puncture training model based on MR damper Xin Yang Fuzhou University, China
11:25-11:40	Oral: Design and simulation of a novel magnetorheological energy absorber with stroke-related damping control Minghui Zhu Chongqing University, China

*Kingworld Hotel (Conference Hall)*

10:00-12:00	
Concurrent Session 2-6: Best oral award	
Session Chair: Prof. Seung-Bok Choi	
10:00-10:15	Oral: Programmable ferromagnetic soft smart structures with integrated sensing-actuation Wenheng Han Lanzhou University, China
10:15-10:30	Oral: Magnetic colloidal ratchet effect in a shear-thinning fluid (MRF) Guillermo Camacho University of Granada, Spain
10:30-10:45	Oral: Particle-level dynamic simulation for magnetorheological properties of the magnetic fluid based on nanospheres-chains Kang Wang University of Science and Technology of China, China
10:45-11:00	Oral: A study on bi-directional tunability magnetorheological vibration absorber for pipeline Yuanpeng Xie Chongqing University, China
11:00-11:15	Oral: Preparation, magnetorheological properties and stability of ci-mxene based magnetorheological fluid Yuxi Sun University of Science and Technology of China, China
11:15-11:30	Oral: Design of a stiffness-tunable and energy-efficient hand exoskeleton for enhancement of grip endurance and strength Xianlong Mai University of Science and Technology of China, China
11:30-11:45	Oral: Electrorheological properties of phosphonium-based polyionic liquid and its composites with halloysite and graphene oxide Calis-Ismetoglu Gokce Gazi University, Turkey
11:45-12:00	Oral: Development of a joint actuation with high dexterity and strong explosive output capacity Shengfeng Zhu University of Science and Technology of China, China

Kingworld Hotel (Hotel Buffet)

12:10-13:30
Buffet Lunch

*Kingworld Hotel (International Conference Hall)*

14:00-15:40	
Concurrent Session 1-7: MRF device and application	
Session Chair: Prof. Jinbo Wu	
14:00-14:20	Invited: Performance evaluation of a novel multi-stage shear mode magnetorheological damper with composite lithium-based grease Xiaomin Dong Chongqing University, China
14:20-14:40	Invited: Development of a novel semi-active MRE isolation with negative stiffness for reducing the transverse vibration of high-speed train Jian Yang Anhui University, China
14:40-14:55	Oral: Study on pipeline vibration control using magnetorheological-tuned mass damper Lifan Wu Chongqing University, China
14:55-15:10	Oral: Chaos suppression control of a vibration isolation system with magnetorheological damper Hailong Zhang Nanjing Normal University, China
15:10-15:25	Oral: Study on variable-gap disc-type magnetorheological brake Jie Wu, Hao Huang, Hongyang Xie Hubei University of Technology, China
15:25-15:40	Oral: Investigation of a magnetorheological elastomer rubber joint with tunable vibration bandgap Ning Gong University of Science and Technology of China, China

Kingworld Hotel (Conference Hall)

14:00-15:45	
Concurrent Session 2-7: Best oral award	
Session Chair: Prof. Seung-Bok Choi	
14:00-14:15	Oral: Quasi-passive lower extremity exoskeleton with clutched parallel elastic magnetorheological actuators for jumping assistance and safe landing Wenpan Wang University of Science and Technology of China, China
14:15-14:30	Oral: Tunable magnetorheological electromagnetic absorber based on multiscale design and topology Ruyi Gan Chongqing university, China
14:30-14:45	Oral: Magnetorheological elastomer based multi-functional e-skins with thermal-magnetic-mechanical monitoring performance Shuai Liu University of Science and Technology of China, China



14:45-15:00	Oral: Experimental study and modeling of rubber joints for railway vehicles using magnetorheological shear stiffening elastomers Liping Gong University of Wollongong, Australia
15:00-15:15	Oral: Investigation on the anti-sedimentation of a magnetorheological rotary brake with the shaft integrating self-homogenization function Tong Wu Beijing Institute of Technology, China
15:15-15:30	Oral: Mechanism of shear-thinning effects of magnetorheological fluid: particle chains breaking off Haopeng Li China University of Mining and Technology, China
15:30-15:45	Oral: Controlled particle migration in magnetorheological fluid utilized for online rotor balancing Valentin Schreiner Technical University of Berlin, Germany

15:40-16:00**Tea Break**

*Kingworld Hotel (International Conference Hall)***16:00-17:25****Concurrent Session 1-8: ER/MR material and device****Session Chair: A. Prof. Sheng Wang, Prof. Jian Yang**

16:00-16:20	Invited: ER effect of self-crosslinked poly(ionic liquid)s Jianbo Yin Northwestern Polytechnical University, China
16:20-16:40	Invited: Semi-active drop-weight impact resistance control for hydraulic damping actuator based on MR Hui Huang Fuzhou University, China
16:40-16:55	Oral: Enhanced friction performance of magnetorheological elastomers using surface structure design Xuanrui Zhang Chongqing University of Posts and Telecommunications, China
16:55-17:10	Oral: Non-dimensional modeling of magnetorheological energy absorbers under step impact Mengjie Shou Chongqing University of Posts and Telecommunications, China
17:10-17:25	Oral: Incremental proportion integration differentiation control of all-terrain vehicle magnetorheological suspension system under low-frequency disturbances Dongbin Xia Chongqing University, China
17:25-17:40	Oral: Investigation of clusters magnetorheological electro-fenton composite polishing process for single-crystal gan wafer based on bbd experimental method Qiongbai Zheng Guangdong University of Technology, China

*Kingworld Hotel (Conference Hall)***16:00-17:40****Concurrent Session 2-8 MR material and device****Session Chair: Prof. Xianxu Bai, A. Prof. Ping-an Yang**

16:00-16:20	Invited: Mechanical mechanism of bionic buffer transmission of magnetorheological intelligent transmission joint for robots Hongzhan Lv Donghua University, China
16:20-16:40	Invited: State estimation of all-terrain vehicle with magnetorheological suspension Lei Luo Chongqing University, China



16:40-16:55	Oral: Revealing the interaction mechanism among the compound motion, the variable action gap and the speed reduction performance of a miniature MR brake Tairong Zhu, Yunlai Liao Beijing Institute of Technology, China
16:55-17:10	Oral: Sensing method on magnetorheological fluid concentration and in-situ settlement monitoring based on wire wound inductor Na An Chongqing University, China
17:10-17:25	Oral: A novel 'S' chain Structure mechanism model of magneto-rheological elastomer Hailong Zhang Nanjing Normal University, China
17:25-17:40	Oral: Study of a method on measurement of magnetorheological fluid redispersibility Wei Zhou Chongqing University, China
17:40-17:55	Oral: Dynamic performance analysis of an enhanced radial magnetorheological valve based on magneto-fluidic coupling Feng Zhou East China Jiaotong University, China

Kingworld Hotel (Grand Banquet Hall)

18:00-19:30

Banquet & Sichuan Opera show



Day 4 Monday, 12th June 2023

Kingworld Hotel (International Conference Hall)

08:30-09:30

Plenary Lecture

Session Chair: Prof. Rongjia Tao

08:30-09:00	Plenary: 3D printing magnetorheological elastomer for magnetic actuator applications Prof. Xinglong Gong University of Science and Technology of China, China.
09:00-09:30	Plenary: Research on magnetorheological suspension for all terrain vehicles Prof. Miao Yu Chongqing University, China.

09:30-10:00

Tea Break

10:00-11:00

Closing Ceremony and Award Ceremony

Kingworld Hotel (Hotel Buffet)

12:00-13:30

Buffet Lunch

14:00-18:00

A trip to Chongqing Zoo and watch pandas, Yangtze River Cableway.

Kingworld Hotel (Hotel Buffet)

18:00-19:30

Buffet Dinner

Day 5 Monday, 13th June 2023

08:30-19:30

Plan C	A trip to Wulong Karst tourist area (fee: about US\$61/per person)
Plan D	A trip to Dazu Rock Carving & Mount Baoding (fee: about US\$52/per person)

An Introduction to Chongqing



Chongqing is the largest municipality in Southwest China, with more than 30 million people. Known as the Mountain City, it has maintained rapid economic growth and development, while still preserving its natural environments. Chongqing boasts bumpy terrains, a wealth of water reserves, mineral resources, and dense forests.

Chongqing is surrounded by mountains on all sides. The Daba mountains in the North, Wushan Mountain in the East, Wuling and Wulong Mountains to the West, and Dalou Mountains to the south. This unique geographical environment is responsible for Chongqing hot and humid summers and mild temperate winters. Two large rivers are running through Chongqing, the Yangtze and Jialing rivers. Chongqing becomes a beautiful city with mountain features and water features.

Chongqing has a subtropical monsoon climate. It is close to summer in June, so the weather is cool but not very hot. The foggy Chongqing turns to have fewer foggy days and cloudy days in the early



summer than other seasons. It's quite suitable for taking a trip.

In addition to our travel plans, Chongqing also has many other tourist attractions, such as **Furong Cave, Fairy Mountain, Chongqing Zoo, Hongya Cave, Ciqikou Ancient Town, et al.** The door of Chongqing is always open for all the delegates. Taking ERMR 2023 conference as a good opportunity, you will enjoy the journey.



Notes

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THE 18th INTERNATIONAL CONFERENCE ON ELECTORRHEOLOGICAL
FLUIDS AND MAGNETORHEOLOGICAL SUSPENSIONS

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THE 18th INTERNATIONAL CONFERENCE ON ELECTORRHEOLOGICAL
FLUIDS AND MAGNETORHEOLOGICAL SUSPENSIONS

Anhui Weiwei Rubber Parts Group Co.Ltd.

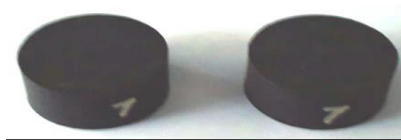
MRE material / MRE isolator

➤ Product description:

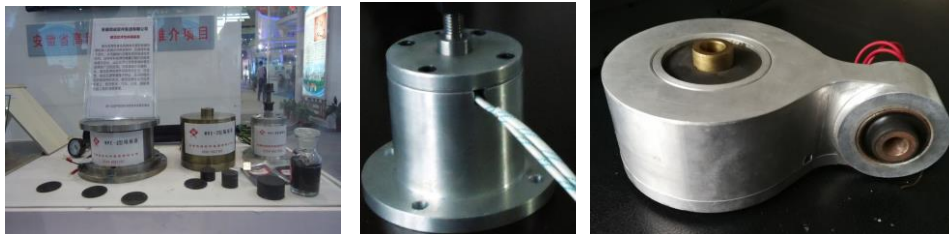
Magnetorheological elastomer (MRE) material is a new kind of material developed rapidly in recent years, it will produce magnetorheological effect in the changing magnetic field, so that its stiffness and damping characteristics will change. By using the magnetorheological effect of magnetorheological elastomer (MRE) changing with magnetic field, various devices such as adaptive shock absorbers, variable stiffness vibration isolators, self-tuning dampers, flexible drivers, artificial muscles and microfluidic mixers can be designed and manufactured.

Magnetorheological elastomer (MRE) materials can be widely used in aerospace, protective devices, devices vibration reduction, precision machining, medical instruments, automatic control, mechanical engineering, household appliances and other industries.

➤ MRE tmaterial photo:



➤ MRE isolator Picture:



➤ Patent:





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MAGNETO-RHEOLOGICAL DEVICE

- Magneto-rheological (MR) fluids react almost instantly to an applied magnetic field with a change in their rheological properties
- Typical applications: clutches, sealings, brakes, shock absorbers, seismic dampers, human prostheses
- Flux density: max. 1.4 Tesla
- From -10 °C to +170 °C (lower temperatures on request)
- For parallel-plate, twin plate and cone-plate geometries

ELECTRO-RHEOLOGICAL DEVICE

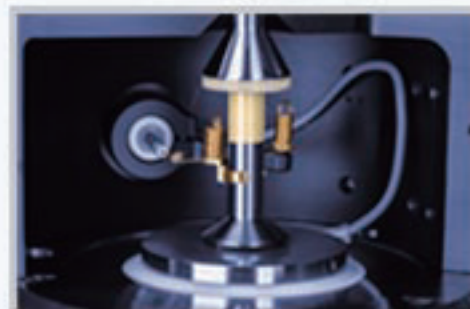
- ER fluids change their rheological properties dramatically when an electric field is applied
- Typical applications: clutches, brakes, pumps, dampers, shock absorbers, printing inks, haptic devices
- Voltage range: 0 kV to 12.5 kV DC (AC on request)
- From -40 °C to +220 °C
- For parallel-plate and concentric-cylinder geometries



Standard MR device



ER device with Rotation
contact spring



ER device with Oscillation
contact wire

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