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Zhejiang University-University of Illinois at Urbana-Champaign Institute
浙江大学伊利诺伊大学厄巴纳香槟校区联合学院

ZJUI

Newsletter

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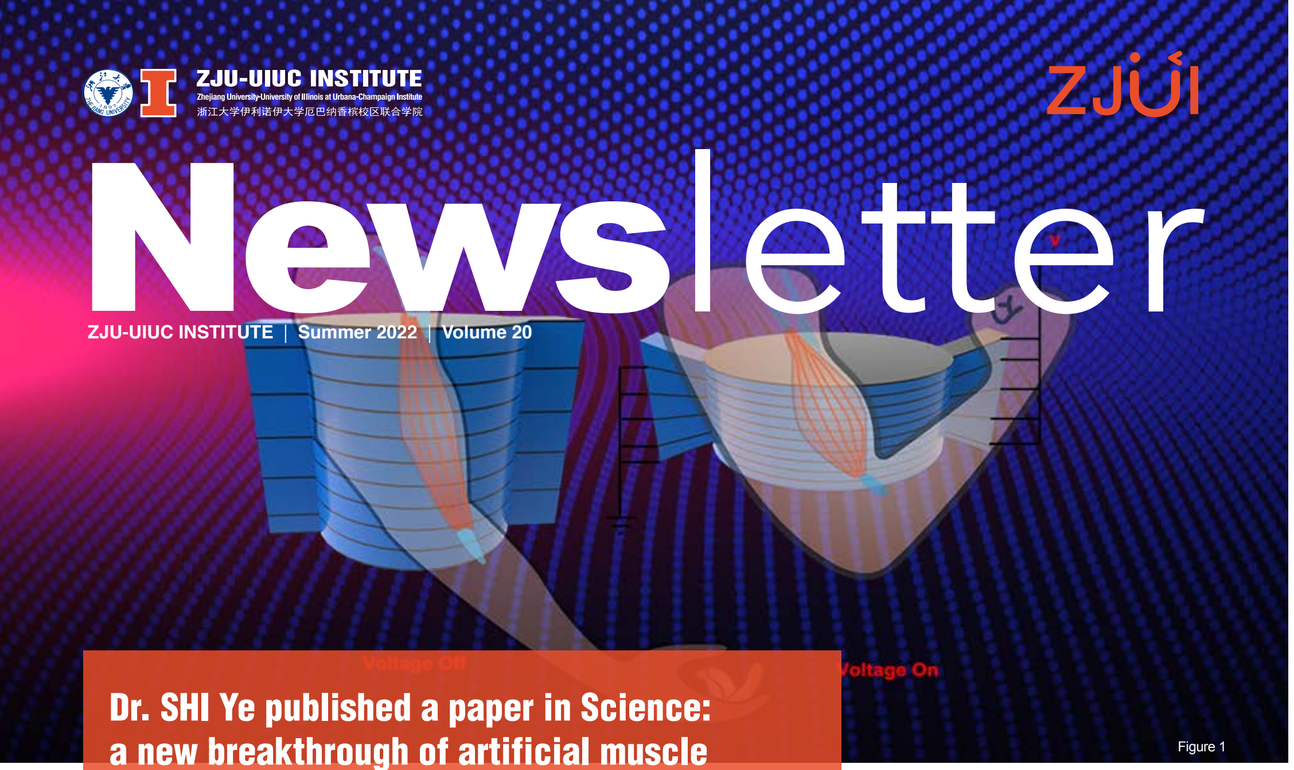


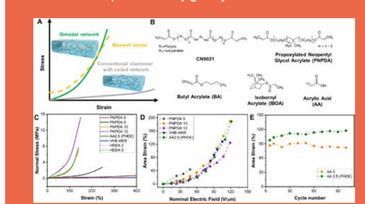
Figure 1

Dr. SHI Ye published a paper in Science: a new breakthrough of artificial muscle

Date: 16/07/2022
Article/ Photo: Research team of Dr. SHI Ye

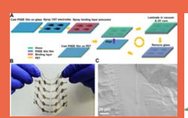
On 7th July 2022, the world-renowned journal Science published an online research paper titled "A processable, high-performance dielectric elastomer (PHDE) and multilayering process." The first author of the paper, Dr. SHI Ye is currently a researcher and Assistant Professor of ZJUI. The corresponding author is Professor PEI Qibing, from the University of California, Los Angeles. The paper reported the synthesis of new high-performance dielectric elastomer materials and a new process for producing multilayering devices (Figure 1).

Dielectric elastomers (DEs) have the advantages of large deformation, high energy density, and fast response speed. Therefore, they are widely used as artificial muscle materials in both academic research and practical applications. Dielectric elastomer actuator (DEA) is made by a DE film sandwiched between two compliant electrodes. Under a voltage, the electric field generates Maxwell stress, and compresses the film in the thickness direction and expands it in area. Currently commercially available, 3M very high bond (VHB) acrylate tapes and silicone elastomer resins are the most widely used DE materials. However, they both have their drawbacks. VHBs suffer from high viscoelastic losses, and silicones tend to exhibit low maximum strains and dielectric strength. Additionally, many conventional soft elastomers often have electromechanical instability (EMI). Under constant voltage, the electric field increases as the DE film thickness decreases, resulting in progressively greater strain that proceeds until failure. One of the approaches to solve the problem is pre-stretching. However, this approach requires a rigid frame to maintain the applied strain, which decreases the processability greatly.

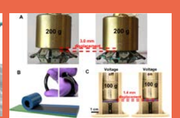


▲ Figure 2

To solve the problems above, Dr. SHI Ye et al. designed a new type of processable, high-performance dielectric elastomer (PHDE), which can be compressed and stretched flexibly under electric stimuli. They built a bimodal-networked elastomer using two cross-linkers with different chain lengths (Figure 2). This material is soft initially and can be easily compressed to reach high actuation performance. After reaching a critical actuation strain, PHDE stiffens due to the stress on short chains in the network, thus being able to resist Maxwell stress, suppress EMI, and increase stability. Additionally, Dr. SHI Ye et al. introduced a small amount of additional hydrogen bonds into the network, which reduces the viscoelastic loss and increases its response speed. PHDE exhibits a maximum areal strain of 190% and maintains strains higher than 110% without pre-stretching at 2 Hz. Correspondingly, the measured PHED energy density is 88J/kg and the power density is over 600W/kg. As comparison, natural muscles show energy density ranging from 0.4J/kg to 40J/kg, and their power density is often lower than 100W/kg.



▲ Figure 3



▲ Figure 4

In order to increase the overall energy and power output of DEA, Dr. SHI Ye et al. developed a dry stacking method to produce multilayered DEAs (Figure 3). Compared with traditional wet stacking methods, this method has the advantages of high efficiency, compatibility with large scale production, high yield, and low loss of performance. The multilayered actuators maintained high response speed and reached strains of 110% at 2 Hz and 60% at 20Hz. Based on multilayered DEAs, Dr. SHI Ye et al. successfully fabricated spider actuators and multifunctional roll actuators (Figure 4), which demonstrated the promise of PHDE in various applications such as soft robotics, biomedical devices and wearable devices.

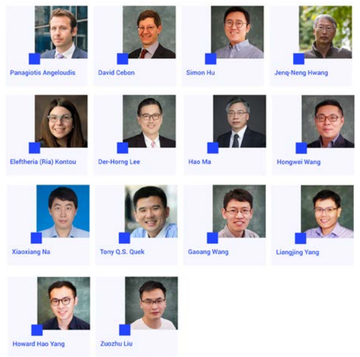
The first affiliation of the paper is UCLA, the second is ZJUI, and the third is SRI International from California.

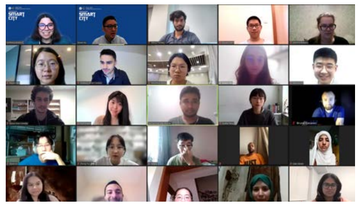
Paper Link:
https://www.science.org/doi/10.1126/science.abn0099

The unity of knowledge and action: 5 student practice bases were established!

Date:14/06/2022 Article: LI Haoyu, Stephanie Zhang
Photo: Stephanie Zhang

On June 10, Zhejiang University-University of Illinois at Urbana-Champaign Institute (ZJUI) and Wuzhen Lab (Tongxiang Innovation Center of Yangtze Delta Region Institute of Tsinghua University, Zhejiang), Hangzhou Pangu Automation Systems Co., Ltd., Zhejiang Global Machinery Technology Co., Ltd., Hahn Schickard China/Hahn-Schickard Research Institute for Applied Microsystems and ZINSIGHT Technology (Shanghai) Co., Ltd. held a signing ceremony in Faculty Club of International Campus, Zhejiang University. In the future, ZJUI will build student learning and practice bases together with five contracted enterprises to provide students with more internship opportunities so that they can explore the unity of knowledge to practice and improve their innovative and practical abilities. Prof. CAI Quan, Executive Vice Secretary of the Party Committee and Vice Dean of International Campus, Prof. Der-Horng Lee, Dean of ZJUI, and Prof. WANG Hongwei, Vice Dean of ZJUI attended the ceremony. The signing ceremony was hosted by Prof. MA Hao, Vice Dean of ZJUI.





Zhejiang University 2022 SDG Global Summer School "Smart City" Concluded Successfully

Date: 17/08/2022 Article: Stephanie

On August 15th, Zhejiang University 2022 SDG Global Summer School successfully concluded. "Smart City," one of the key courses in the summer school, focused on two frontier integrated sessions, "Intelligent Transportation & Smart Mobility" and "Intelligent Internet of Things & Intelligent Service Robots." During these 15 days, 15 prestigious experts, 48 project groups, and more than 300 students from home and abroad gathered online. Aimed at building a greener and more intelligent future, participants exchanged their knowledge of a smart city, and immersed themselves in cross-cultural communication.

As the product of urbanization and informatization, a smart city is one of the most crucial strategies to achieve sustainable development. By applying a new generation of information technology to various industries in a city, smart city, with the focus on smart transportation, smart internet of things, smart service robotics, and smart energy, responds to different needs intelligently. The smart city will connect and integrate a wide range of systems and services in the interests of better performance, improve the efficiency of resource utilization, optimize urban management and services. It has the capability of improving the quality of life, and creating a more sustainable life for human beings. ZJUI hosted this "Smart City Course," and collaborated with Cambridge University, Imperial London College, University of Washington, University of Illinois at Urbana-Champaign, Singapore University of Technology and Design. The course provides students with a broad perspective and a solid foundation to understand the concept of a smart city, master relevant basic knowledge, and explore its development.

Apart from the intriguing professional courses from our instructors, the course also set up a team project. Students formed teams freely and chose one of three topics to complete. In the final presentation, 48 groups impressed all the faculty members and students with their unique insights and wonderful ideas concerning smart cities.

ZJUI Focuses on sustainable development and promoting technology innovation.. Although Zhejiang University 2022 SDG Global Summer School "Smart City" has come to an end, it represents a new starting point where ZJUIers, together with global faculty members and students, devote ourselves to sustainable development by building a smart city. In the future, join us in building a greener and more intelligent future!

The learning exchange meeting of President Coching Chu's spirit was successfully held

Date: 14/06/2022 Article/Photo: ZHANG Yi

On June 9, 2022, the learning exchange meeting of President Coching Chu's spirit, "Carrying on the virtues of Coching Chu, cultivating outstanding students", jointly organized by ZJUI CPC Branch, ZJUI students CPC Branches, was held at the International Campus, Zhejiang University. Ms. LI Hangchun, the academic editor of the Zhejiang University Institute for Advanced Study in Humanities and Social Sciences, made a special report. Prof. WANG Yufen, Deputy Secretary of the Party Committee and Secretary of Committee for Discipline Inspection of the International Campus, and Prof. Der-Horng Lee, Dean of ZJUI, attended the event and delivered speeches. The event was presided over by Prof. MA Hao, Secretary of the ZJUI CPC Branch and Vice Dean of ZJUI.

Prof. WANG Yufen pointed out that this year is the 125th anniversary of Zhejiang University and the university's cultural construction year. On the occasion of the 20th anniversary of the official partnership between Zhejiang University and UIUC, the holding of this event fits the requirements of the university's cultural construction. Hopefully this will deepen faculty and students' understanding about Coching Chu's spirit. He taught students and faculty to learn, think , practice, study deeply, work perseveringly, strive for first place, and to contribute wisdom to the effort of creating an "International Collaborative Education Model".

Prof. Der-Horng Lee gave a keynote speech at the meeting. He said that as an institute jointly run by ZJU and UIUC, ZJUI should carry on the spirit of President Coching Chu, which is the cultural intersection of the two universities, inherit the spirit of President Chu, and internalize it in heart, externalize it in action. This is the sacred responsibility bestowed upon ZJUI by history, and also a solemn commitment to the future. He said that ZJUI will further deepen the spirit of President Coching Chu as the spiritual and cultural connotation of the institute, promote the inheritance and development of the spirit of President Coching Chu, and make it a powerful spiritual force leading ZJUI forward.

Ms. LI Hangchun presented a lively special report on President Coching Chu to the participated faculty members and students. She talked about the experiences of President Coching Chu, and his persistence in writing a 10 million-word diary. She spoke of his firmness in "democratic governance" when he was in charge of the university, and his arduous struggle during the westward migration. She vividly depicted President Coching Chu as a man with a truth-seeking and pragmatic educational sentiment. He was a man with democratic and scientific educational ambition, a role model of educational masters who put the educational practice of respecting teachers and loving students into modern university education. By discussing his spirit, she called on faculty members and students to stick to the tenet of "seeking truth" and to keep forging ahead.

The event also invited four sharers from ZJUI to explain their understanding and practice of President Coching Chu's spirit based on their personal and learning experience. They are, CHEN Wenchao, Assistant Professor; TANG Zhizhan, a 2021 graduate of ZJUI and a member of the Postgraduate Voluntary Teaching Group of the Chinese Young Volunteers Western Poverty Alleviation Relay Program; CHEN Haonan, a 2021 graduate student of electronic information; JIN Yiquan, a 2020 undergraduate student of mechanical engineering.

The event has received the guidance and strong support of the CPC of International Campus. Prof. WANG Hongwei and Prof. CHEN Xiqun, Vice Deans of ZJUI, all ZJUI faculty and staff, student representatives, and faculty members of the international campus attended the event.

Date:07/06/2022 Article: Research Group of CHEN Wenchao

WANG Yimin, a graduate student of ZJUI, published a paper in the authoritative journal IEEE T-MTT: Research on hot carrier reliability of FinFET based on artificial intelligence approach

Recently, IEEE Transactions on Microwave Theory and Techniques (IEEE T-MTT), the flagship journal of the IEEE Microwave Theory and Techniques Society (MTT-S), accepted one of our latest research results, with graduate student WANG Yimin as the first author of the paper. IEEE T-MTT is recognized as the first journal in the international microwave/millimeter-wave field and is the most authoritative and influential international journal in the field of RF and microwave/millimeter wave technology, focusing on theoretical and experimental research in the field of microwave/millimeter wave devices, components, circuits, and systems.

The authors use artificial intelligence methods to study the hot carrier injection (HCI) reliability problem of FinFET, which is of wide interest in academia and industry. In the paper, an artificial neural network (ANN) model for HCI prediction is proposed for FinFET with consideration of self-heating effect under various voltage stresses and environment temperature. The developed model is accurate as demonstrated in experimental results. The model can significantly reduce the simulation cost once the ANN model is built for the HCI prediction of FinFETs, which has great potential for reliability design in circuits and systems.

WANG Yimin is a graduate student of ZJUI majoring in Electronic Information in the class of 2020. Talking about the milestones achieved, he said, "Since my enrollment, I have been deeply influenced by the interdisciplinary cultivation of the institute, and my achievements cannot be separated from the inculcation and support of the institute's cross-engineering scientific research environment."

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Date: 30/07/2022 Article/Photo: James Qi

The first International Student Forum on Engineered Bamboo Structures (IS-FEBS) was held successfully

How to improve the stiffness and bearing capacity of the connection points if the bamboo structure building is to become a “high-rise building”? How can the bamboo forest with large volume and wide area be transformed into a beautiful and prosperous village in a simple way? What is the potential application of bamboo architecture in reaching the goal of carbon neutrality?

The first International Student Forum on Engineered Bamboo Structures (IS-FEBS) held successfully in Ninghai, Zhejiang Province from July 27-28, 2022. The forum was co-hosted by the Zhejiang University-University of Illinois at Urbana-Champaign Institute (ZJUI) and Zhejiang University (Ninghai) Joint Research Center for Bio-Based Materials and Carbon Neutral Development. More than one hundred experts and diverse graduate students from Zhejiang University, Tongji University, Tianjin University, Harbin Industrial University, Hainan University, Nanjing Tech University, Universidad de los Andes, Colombia and other universities at home and abroad participated in the event. A combination of online and onsite discussion ensued concerning power “carbon neutral” goal, accelerating the construction of ecological civilization and rural revitalization.

Interdisciplinary Innovation Fuels ZJUI students to Shine at the 8th Zhejiang International College Students’ “Internet+” Innovation and Entrepreneurship Competition

In the afternoon of July 30, 2022, the closing and award ceremony of the 8th Zhejiang International College Students’ “Internet+” Innovation and Entrepreneurship Competition was held at the Zhejiang Sci-Tech University, putting a period to the five-month long competition. Zhejiang University was designated “Excellent Organization Award” and won 16 Gold Awards. ZJUI student LIU Qianqi from Mechanical Engineering, Class of 2024, along with his teammates HU Jiajun, LI Zhanpeng, WU Feiyang, and ZHANG Zhibo won a Gold Award with their “Biothinker Sample Preparation Workstations.” SU Chang, LIN Ziyi, GUO Shuhan, ZHOU Jincheng and RUAN Yucheng won a Bronze Award with the “YunLianZhiFang-A Blockchain Education Integrated Service Platform” established by students from College of Computer Science and Technology.

LIU Qianqi, leader of the awarded team, said, “The biggest challenge was our busy schedule at the early stage of our project. The material submission deadline was unfortunately during our final examination period. However, all our team members sacrificed their free time, even working overnight to test models and collect materials.” The teammates have never worked as a team in such a multi-disciplinary and effort-demanding project. However, with their winning mentality and teamwork spirit, they managed to blaze through their challenges. “It was very difficult to coordinate our work since we have so many people on the team. Luckily, we have encountered similar circumstances that required teamwork, project-management and time-management skills during our previous ZJUI courses,” said LIU Qianqi.

When asked if ZJUI courses had been of any help, Liu answered “Nearly all the important innovations and breakthroughs in our project are inspired by ZJUI courses. What we learned from Computer-aided Design courses made our models theoretically possible. What we learned from our Design for Manufacturability courses helped us understand the process of designing a product, including understanding the market, background research, drafting of our design, computer-aided design and building models. They also cultivated our ability in analyzing the cost, competitive products, patent, and in building models, which were all crucial checkpoints for grading in the competition. Meanwhile, the English teaching environment at the International Campus made it possible for us to smoothly read the English patents, technical documents, and papers of foreign competing products, and quickly understand the cutting-edge technology of the industry.

As Assist. Prof. HU Huan said, the full support of the entire campus, and the perseverance to overcome difficulties have cultivated excellent projects with cross-disciplinary innovation demonstrating the combination of production, education, and research.

Date: 09/08/2022 Article: XUE Qian; YE Chenchen Photo: Youth League Committee of Zhejiang University; Awarded teams

Dr. QIAN Chao published a paper in Nature Communications: Breaking the fundamental scattering limit with gain metasurfaces

Date: 05/08/2022 Article: Research Group of Dr. QIAN Chao Photo: Research Group of Dr. QIAN Chao

Recently, Dr. QIAN Chao, researcher of ZJUI, together with domestic and foreign researchers, has used gain metasurfaces to break the fundamental scattering limit and reveal the transient response of scattering enhancement. The results were published in *Nature Communications* under the title of “Breaking the fundamental scattering limit with gain metasurfaces”.

Free manipulation of electromagnetic scattering is a challenging research topic. As early as 1871, light scattering phenomena have been studied by scientists such as Rayleigh, Raman, and Mie. Among them, enhancing the scattering of particles has important application prospects in fields such as photovoltaic power generation and biosensing imaging due to its ability to improve the optical resolution and sensitivity of the surrounding medium. In electromagnetic stealth, we can envision small UAVs disguised as mega UAVs to deceive enemy detection systems. However, most of the traditional methods of enhancing scattering such as transformation optics and surface plasmon resonance work in the lossy regime, where the fundamental scattering limit of the object still exists and cannot enhance scattering at will.

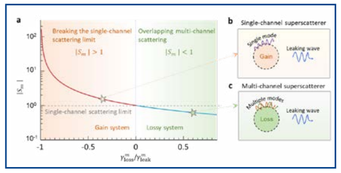
To address this challenge, we show how to break this “cage” by exploiting gain media (Figure 1). According to the temporal coupled mode theory, the scattering limit will fail in the gain regime, so the scattering cross-section can be increased infinitely. On the aspect of visual effect, it is expected to build an “image” much larger than the size of the object itself. We analyze the transient response of scattering by illuminating the scatterer with a window function and reveal the whole process of energy accumulation-equilibrium-release in the time domain (Figure 2) and find that the homeostasis set up time is different for objects with different scattering strengths. For example, the gain scatterer in Figure 2 has a homeostasis set up time of 28.5 nanoseconds, while the lossy scatterer in Figure 2b has a homeostasis set up time of 4.1 nanoseconds.

How to experimentally realize gain materials is the key to breaking the scattering limit, and it is also a very challenging research topic at present. In this regard, we propose a method of constructing gain metasurfaces using tunneling diodes, which have the property of negative resistance and can amplify electromagnetic waves. Taking the subwavelength cylinder as the basic model, using the Mie scattering theory and the inverse design optimization algorithm, the total scattering cross section is more than 40 times the fundamental scattering limit. In the experiment, we place the gain scatterer in the waveguide to verify the phenomenon from both near and far field perspectives.

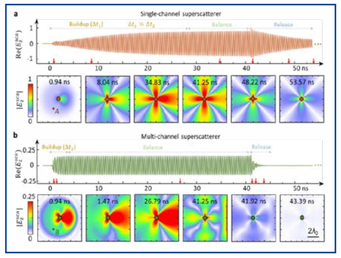
The results generalize the prevailing paradigms for scattering systems and provide a new idea for freely manipulating electromagnetic scattering. The proposed gain metasurfaces provide a versatile physical platform for verifying other exotic scattering phenomena and has promising applications in tunable metamaterials, nanolaser, and non-Hermitian invisibility.

Researcher QIAN Chao is the first author and the corresponding author of the paper. The research was done in collaboration with domestic and foreign experts including researcher LIN Xiao, Professor LI Erping and Professor CHEN Hongsheng. The work was supported by the National Natural Science Foundation of China and other projects.

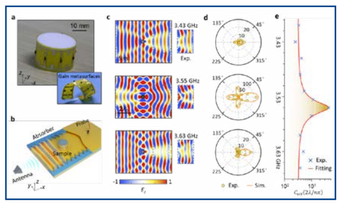
Article link: https://www.nature.com/articles/s41467-022-32067-9



▲ Figure 1: breaking the fundamental physical scattering limit



▲ Figure 2: transient response of scatters



▲ Figure 3: experimental observation of gain scattering

Date: 01/06/2022 Article/Photo: Research Group of Assis.Professor YANG Liangjing

Prof. XU Chao presented a Seminar on Intelligent Flight: Evolution from Individual to Swarm

On May 21th, Prof. XU Chao, current Associate Dean of the College of Control Science & Engineering, Zhejiang University as well as the inaugural Dean of ZJU Huzhou Institute visited ZJUI and presented a wonderful talk themed as “Intelligent Flight: Evolution from Individual to Swarm.” Focusing on the latest research progress of his research team, Prof. XU had an in-depth exchange with the students and faculty members in attendance. The seminar was hosted by Prof. Lee Der-Horng, Dean of the ZJUI.

Prof. XU began his prologue with this statement:“Aerial Robot (especially multi-rotor copters) is an ideal research platform for autonomous guidance, navigation, control(GNC) studies.” He then introduced several latest technologies of the Field Autonomous System and Computing (FAST) Laboratory in Zhejiang University including autonomous navigation, micro-drone design and control, real-time planning for aggressive locomotion, and fully autonomous swarming flight. Additionally, combined with several practical applications, Prof. XU had a lively discussion with students and faculty members on the practical application and great value of Unmanned Aerial Systems.

Dr. QIAN Chao published a paper in Science Advances: Homeostatic neuro-metasurfaces for dynamic wireless channel management

Date: 01/08/2022 Article/Photo: Research team of Dr. QIAN Chao

Recently, Assistant Professor QIAN Chao of ZJUI, together with domestic and international researchers, proposed deep learning enabled homeostatic neuro-metasurfaces to achieve real-timewireless channel management in dynamic environments. The results were published in *Science Advances* entitled “Homeostatic neuro-metasurfaces for dynamic wireless channel management”, with an impact factor of 14.957.

Smart city is a generic term used to describe an urban area that leverages information and communication technologies (ICTs) to optimize transportation systems, social sustainability, resource allocation and other community services. In particular, recent decades have witnessed an unprecedented promotion due to the big advances in the Internet of Things (IoT) and artificial intelligence. Much effort has been initiated to pursue intellectualization at the data link level and network level. However, the physical level—wireless channel, an electromagnetic (EM) link between the transmitter and the receiver with complex propagations inside—also plays an important role. If we can manage the wireless channel as desired, a radically new EM smart city/infrastructure could be created.

A fundamental backbone to create the aforementioned vision is to physically manage the wireless channel and modify the EM environment even in disordered surroundings. Conventionally, the engineering of wireless channel typically necessitates high-complexity and energy-consuming hardware at base stations, and it is limited by lengthy and iterative optimization strategies. In the past years, metasurfaces—an artificial wave-functional interface composed of arrays of subwavelength resonators—have attracted extensive attention for manipulating a wireless channel in a green and cost-effective manner. However, the related metasurfaces based works share a common limitation: either they are static in nature (set in stone after fabrication) or work in a trial-and-error mode to satisfy user demands (dependent and iterative).

The group proposes the concept of homeostatic neuro-metasurfaces that manage the wireless channel globally and monolithically during the propagation process to automatically meet users’ requirements. The neuro-metasurfaces are composed of a large number of active metasurfaces units, where each active element modulates the amplitude, phase, and polarization of the incident wave independently. A miniature stepper motor applies mechanical drive to each neuro-metasurfaces unit. This mechanical modulation does not require a continuous energy supply and has the advantages of non-volatility and low energy consumption, which improves the resistance of the metasurfaces to interference in an unstable environment. Based on the appropriate amount of training data and data augmentation techniques, a global inverse design model based on deep learning is established to build an “expressway” between the wireless channel and the arrangement of the neuro-metasurfaces.

The research team experimentally built a perception (EM detector) - decision (global inverse design) - execution (neuro-metasurfaces) system. The generality of global inverse design and the robustness of the neuro-metasurfaces were verified by first randomly selecting a test set and then extending the experimental environment to real scenarios to dynamically manage the wireless channels without human intervention.

This work combines metasurfaces with deep learning to empower neuro-metasurfaces the ability to independently analyze and solve problems, providing new ideas for EM smart city infrastructure construction. This on-site problem-solving capability is expected to be extended to areas with high real-time requirements, such as dynamic EM stealth and imaging in random media.

Dr. FAN Zhixiang is the first author of the paper, and Assistant Professor QIAN Chao is the corresponding author. The research was done in collaboration with Prof. CHEN Hongsheng, Prof. LI Erping, and Associate Prof. ZHENG Bin. The work was supported by the National Natural Science Foundation of China and other projects.

Article link: https://doi.org/10.1126/sciadv.abn7905

A special session on Adaptive and Resilient Cyber-Physical Manufacturing Networks was successfully organized

Date: 01/09/2022 Article: Group of Prof. Liangjing Yang Photo: Group of Prof. Liangjing Yang

On Aug 23, 2022, the Center for Adaptive, Resilient Cyber-Physical Manufacturing Networks (AR-CyMaN) successfully organized a special session on Adaptive and Resilient Cyber-Physical Manufacturing Networks in the 18th IEEE International Conference on Automation Science and Engineering (CASE 2022).

CASE 2022 is the flagship conference of the IEEE Robotics & Automation Society, which provides a primary international forum for automation researchers and practitioners to present and discuss their work. This year, the conference was held in Mexico City with a satellite site at Chengdu, China and a hybrid online platform to accommodate participation from all parts of the world.

Initiated by the center’s leading researchers, this special session aims to encourage more interesting research based on the collaborations between the center’s members, and is dedicated for exchanging wonderful ideas on adaptive and resilient cyber-physical manufacturing networks. It explored frameworks that make advanced manufacturing more capable, accessible, and democratic to spur innovation and enterprise. Specifically, we aim to consider: (1) Interactions between autonomous hardware and software to produce verifiable and safe manufacturing processes; (2) The curation and use of networks and data to optimize performance; (3) Continuous analysis and learning for both low- and high-level decision-making and control; and (4) On-the-fly adaptation to changing needs and detected errors or risks to ensure resilience.

This special session was chaired by Prof. Hongwei Wang and co-chaired by Asst. Prof. Liangjing Yang, who are the Lead and Co-lead of the Center for Ar-CyMaN, respectively. Featuring six exciting presentations, the session was filled with fruitful exchange of comments and active discussion amongst conference attendees around the world gathered in Mexico City, Chengdu City and Online platform.

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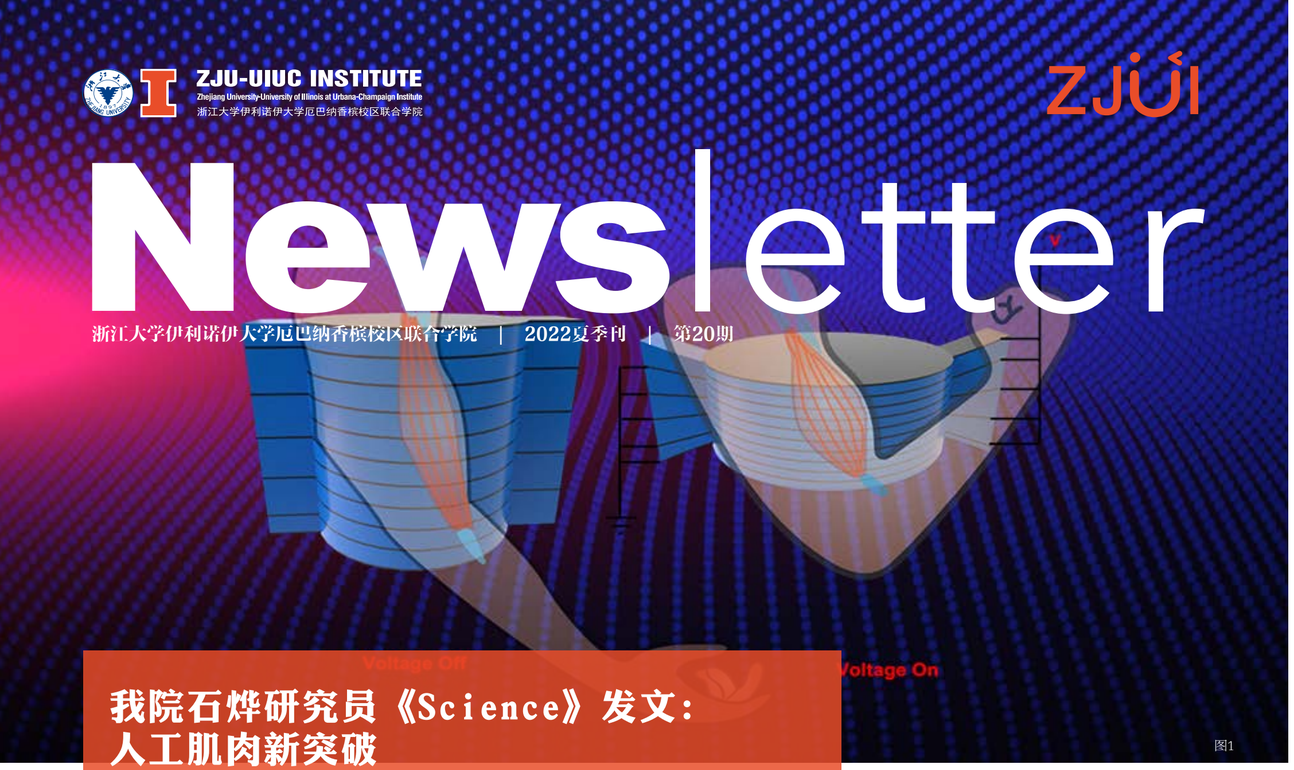


图1

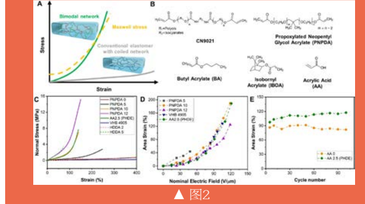
我院石烨研究员《Science》发文：人工肌肉新突破

Date: 16/07/2022
Article/ Photo: Research team of Dr. SHI Ye

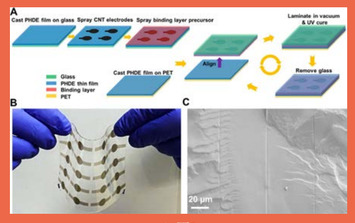
北京时间2022年7月8日，国际著名期刊Science在线发表了题为《A Processable, High-performance Dielectric Elastomer and Multilayering Process（一种可加工的高性能介电弹性体和多层工艺）》的研究论文。论文第一作者石烨博士现为浙江大学伊利诺伊大学厄巴纳香槟校区联合学院（ZJUI）研究员，通讯作者为加州大学洛杉矶分校（UCLA）裴启兵教授。该文报道了新型高性能介电弹性体材料的合成以及叠层器件制备新工艺（图1）。

介电弹性体（dielectric elastomer, DE）拥有形变大、能量密度高、响应速度快等优势，从而作为人工肌肉材料被广泛研究和应用。介电弹性体致动器（dielectric elastomer actuator, DEA）由介电弹性体薄膜和上下两层可拉伸电极构成。在施加电压后，电极间由于静电作用产生Maxwell应力，从而挤压弹性体薄膜产生驱动应变。然而由3M公司生产的VHB胶带和硅橡胶作为目前最常见的两类介电弹性体材料，均存在各自的缺陷。VHB由于高粘弹损耗在较高频率下性能损失巨大，而硅橡胶的最大形变和介电强度均较小。此外，传统介电弹性体容易发生电力学失稳（electromechanical instability, EMI），在驱动电压下持续形变，导致损坏。解决EMI的一种传统方法是对弹性体薄膜进行预拉伸，然而预拉伸之后的材料需要固定在坚硬的框架上，可加工性大大降低。

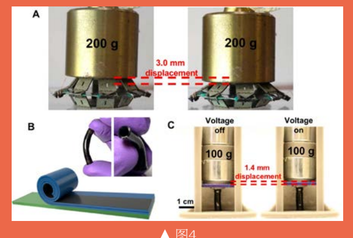
针对以上问题，石烨博士等人合成了一种新型高性能介电弹性体（PHDE），这种材料就像“如意金箍棒”一样在电刺激下能屈能伸。他们通过采用链长显著不同的两种交联剂，合成了具有双峰分布的弹性体网络（图2）。这种材料起初很软，能被轻松挤压达到较高的驱动应变。而在达到临界应变后，它由于网络中的短链受到应力作用而迅速变硬，从而能够抵抗Maxwell应力，抑制EMI，提高稳定性。此外，石烨博士等人在弹性体网络中额外引入少量的氢键，降低了材料的粘弹损耗，使其响应地更快。PHDE在无需预拉伸的情况下达到了190%的最大面积应变，而且在2Hz频率下仍能保持110%的应变。相应的，测量得到的PHDE的能量密度高达88J/kg，功率密度能达到600W/kg以上。对比而言，生物肌肉的能量密度在0.4到40 J/kg的范围内，而其功率密度通常低于100W/kg。



▲ 图2



▲ 图3



▲ 图4

该论文第一完成单位为加州大学洛杉矶分校（UCLA），第二完成单位为ZJUI。此外加州SRI International公司为第三完成单位。

论文链接：https://www.science.org/doi/10.1126/science.abn0099

知行合一，5家ZJUI学生实践基地签约落地！

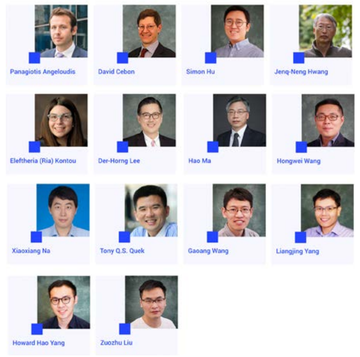
时间：13/06/2022 记者：李昊昱、张旖 摄影：张旖

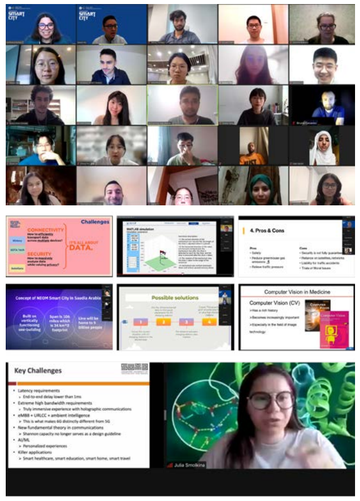
6月10日，浙江大学伊利诺伊大学厄巴纳香槟校区联合学院（ZJUI）与乌镇实验室（浙江清华长三角研究院桐乡创新中心）、杭州盘古自动化系统有限公司、浙江格洛博机械科技股份有限公司、Hahn Schickard China/Hahn-Schickard汉希科特微系统应用研究院和致瞻科技（上海）有限公司共建学生实践基地签约仪式在浙江大学国际联合学院（海宁国际校区）求是书院举行。未来，ZJUI将与5家签约单位一起共建学生实习实践基地，为学生提供更多的实习实践机会，探索知行合一，提升创新实践能力。国际校区党委常务副书记、副院长蔡荃，ZJUI院长李德纮，ZJUI副院长王宏伟出席。签约仪式由ZJUI副院长马皓主持。

蔡荃在致辞中介绍了校区办学和发展情况，并通过大量数据揭示了近年来校区显著的办学成果。他期待ZJUI通过校企联合搭建高水平教学、训练和实践平台，更好地推动人才培养。

李德纮向与会企业代表介绍了校区和ZJUI的浓厚学术氛围、独特培养模式、创新研究生态。他强调，未来要进一步提升办学质量，加强产教融合，发挥学科优势，打造双赢平台。

五家企业依次签约后，企业代表也一一讲话，向与会师生介绍企业之余，更是纷纷表达了要共话合作、共谋发展，推动校企合作稳步启动，迈上台阶。





浙江大学2022年SDG全球暑期学校智慧城市课程顺利结课

时间：16/08/2022 记者：张旖

北京时间8月15日，浙江大学2022年SDG全球暑期学校闭幕，ZJUI开设的智慧城市课程也顺利结课。2个前沿交叉模块，15位资深教授，48个团队项目小组，300余名来自世界各地的学生……在这短短15天内，师生济济一堂，探讨智慧城市领域知识，开展跨文化交流沟通，共创绿色明天，共赢智慧未来。

作为城市化和信息化的产物，智慧城市是实现可持续发展目标的重要战略之一，通过把新一代信息技术运用在城市的各行各业中，以智慧交通、智能物联网、智慧服务机器人、智慧能源等为载体，对各种需求做出智能的响应，将城市的系统和服务打通、集成，提升资源运用的效率，优化城市管理和服务，提升生活质量，为人类创造更美好的可持续生活。ZJUI牵头的智慧城市课程模块，联合了剑桥大学、帝国理工学院、华盛顿大学、伊利诺伊大学厄巴纳香槟校区、新加坡科技设计大学等海外合作伙伴共同开设，为学生了解智慧城市概念，掌握相关基础知识，探索智慧城市发展，提供广阔视野和坚实基础。

除了教授引人入胜的专业课程外，智慧城市课程也设置了团队项目，由学生从给出的三个主题中任选其一并自由组队完成。在最终的团队项目展示环节，48个小组轮番上阵，为全体师生带来了自己对智慧城市的独到见解和奇妙创意。

聚焦可持续发展，推进科技创新，一直是ZJUI矢志不渝的奋斗目标。浙江大学2022年SDG全球暑期学校智慧城市课程虽已结束，但这更是我们联合全球师生共同投身可持续发展，共建智慧城市的新起点。未来，请与我们一起，共创绿色明天，共赢智慧未来！

承竺老之德，育栋梁之才”—— 竺可桢老校长精神学习交流会顺利举行

时间：10/06/2022 记者：张旖 摄影：张旖

2022年6月9日，ZJUI党支部、ZJUI本科生第一党支部、ZJUI本科生第二党支部、ZJUI研究生党支部联合举办的“承竺老之德，育栋梁之才”—— 竺可桢老校长精神学习交流会在国际校区多功能厅举行。浙江大学人文高等研究院学术编审李杭春老师作专题报告，国际校区党委副书记兼纪委书记王玉芬、ZJUI院长李德纮出席活动并讲话。活动由ZJUI党支部书记、副院长马皓主持。

王玉芬指出，今年是校庆125周年，也是学校的文化建设年，在浙江大学和UIUC正式缔结合作伙伴关系20周年之际，此次活动的举办恰好契合了学校文化建设的要求，不仅能促进全体师生对竺可桢精神的了解和思考，也能进一步引领全体师生学思践悟、深学笃行、奋楫争先，为奋力创建“国际合作教育样板区”贡献智慧。

李德纮作大会主旨讲话，他表示，ZJUI作为这样一所浙大和伊利诺伊大学两校合作办学的学院，更应该延续两校文脉交汇点竺可桢老校长的风骨，传承竺老精神，将其内化于心，外化于行，这是历史赋予ZJUI的神圣职责，更是面对未来的庄严承诺。他表示ZJUI将进一步深化竺可桢精神作为学院精神文化内涵，推动竺可桢精神的传承与发展，使其成为引领ZJUI前进的强大精神力量。

李杭春为与会师生带来了一场生动的“一代宗师竺可桢”专题报告，她将竺可桢老校长的“庚款留学生”、“卓有成就的科学家”等特征标签娓娓道来，也通过竺老写下一千万字日记的坚持、掌校时“民主治校”的坚定、西迁中艰苦奋斗的坚守，生动描绘了竺可桢老校长这样一位怀揣着求真务实的教育情怀和民主科学的教育理想，将尊师爱生的教育实践投入到现代大学教育中的一代教育宗师。通过探讨竺可桢的精神，她呼吁师生坚守“求是”，砥砺奋进。

活动还邀请了ZJUI四位分享人结合个人经历和学习体会，阐述自己对竺可桢精神的理解与实践。ZJUI研究员、国家优秀青年基金获得者陈文超通过自己对竺老科学精神的解读，剖析了当前科研工作中存在的问题和改进的方向，分享了自己在课程思政和科研方向选择上的经验做法，提出要聚焦国家战略重点研究布局科研方向。ZJUI 2021届毕业生、中国青年志愿者西部扶贫接力计划研究生支教团成员汤志展回顾了他近一年支教的经历，希望在竺老精神的引领下，能有更多学子加入帮扶西部的队伍。电子信息2021级硕士研究生陈浩楠表示会秉持竺老开放精神，开展多学科交叉融合研究，不畏挫折，不怕失败。机械工程2020级本科生金毅权聚焦竺老西迁精神，表示将不负党和国家对浙大学子的厚望，践行西迁精神，勇担时代重任。

本次活动得到了国际校区党委的指导与大力支持。ZJUI副院长王宏伟、陈喜群，ZJUI全体教职工、学生代表，国际校区机关部门教职工等出席活动。

时间：07/06/2022 记者：陈文超课题组

我院硕士生王翊民在权威期刊《IEEE T-MTT》发表论文：基于人工智能方法的FinFET晶体管热载流子可靠性研究

近期，IEEE微波理论与技术学会（MTT-S）旗舰期刊IEEE Transactions on Microwave Theory and Techniques(IEEE T-MTT)接受了我院一项最新研究成果，硕士研究生王翊民同学为文章第一作者。IEEE T-MTT是国际微波/毫米波领域公认的第一期刊，是国际最具权威和影响力的射频与微波技术领域杰出刊物，专注于与微波/毫米波器件、组件、电路和系统等领域理论和实验研究。

论文具有学科交叉特点，应用人工智能方法研究在学术界和产业界广受关注的FinFET晶体管热载流子可靠性问题。文中提出了一种FinFET晶体管热载流子可靠性神经网络模型，模型可预测不同工作环境中不同频率、不同幅度和不同种类信号作用下的自热效应与开启电压漂移。与实验结果相比，开发的模型具有良好的精度。该模型可大幅降低仿真成本，在器件、电路和系统的可靠性设计中具有重要应用价值。

王翊民是2020级ZJUI电子信息专业硕士生。谈及此次取得的阶段性成果，他表示，“入学以来，我深受学院学科交叉培养影响，取得的成绩离不开学院交叉工程科学研究环境的熏陶与支持。”正如王翊民所述，ZJUI致力于培养学生的跨学科科研能力、实践创新能力和领导力，鼓励学生积极主动地探索前沿科学问题，关注国家攻坚难题，服务社会需要，成为工程俊杰。

对于专业学位硕士研究生，学院更加注重知行合一，鼓励学生参加专业实践，提高应用能力和职业能力。王翊民同学目前正在华为参与相关项目，开展专业实践，致力于提升实践能力，解决重要工程问题。

该论文通讯作者为ZJUI陈文超研究员和李尔平教授。该工作获国家自然科学基金优青项目、省自然基金重大项目等项目支持。

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时间：29/07/2022　记者/摄影：祁圣伟

首届国际研究生现代竹结构论坛顺利举行

竹结构建筑要变成“高楼大厦”，如何提升连接点的刚度和承载力？量大面广的竹林如何最简便地化身建筑，美乡村，旺乡村？竹材建筑在当下实现“碳中和”的目标中有多大应用潜力？

2022年7月27日-28日，首届国际研究生现代竹结构论坛（International Student Forum on Engineered Bamboo Structures，简称IS-FEBS）在浙江省宁海县顺利召开，该论坛由浙江大学伊利诺伊大学厄巴纳香槟校区联合学院（简称ZJUI）与浙江大学（宁海）生物质材料与碳中和建设联合研究中心共同主办。百余位来自浙江大学、同济大学、天津大学、哈尔滨工业大学、海南大学、南京工业大学、哥伦比亚安第斯大学等国内外高校的中外研究生和相关领域专家学者，通过线上线下相结合的方式开展研讨，助力“碳中和”目标实现，助力生态文明建设和乡村振兴。

开幕式上，求是讲席教授、浙江大学（宁海）生物质材料与碳中和建设联合研究中心主任肖岩教授向与会嘉宾介绍了中心的发展历程，中国木材保护工业协会竹质建材分会负责人党文杰作绿色建材下乡村和竹木行业发展相关报告，哥伦比亚安第斯大学Coreal教授专题分享了南美州竹资源和利用情况。为期两天的论坛精彩纷呈，除特邀报告外，还有28个有声有色的研究生学术报告，为与会学者及研究生搭建了良好的交流平台，为开展交叉合作提供了新思路，也激发了研究生的创新思维和国际视野，加强了国内外高校研究生的学科交流。

交叉创新，闪耀赛场！“互联网+”省决赛见证ZJUI学子创新创业成果

近日，ZJUI学生交叉创新，披荆斩棘，在第八届浙江省国际“互联网+”大学生创新创业大赛中斩获国际赛道金奖1项、铜奖1项！

2022年7月30日下午，“建行杯”第八届浙江省国际“互联网+”大学生创新创业大赛闭幕式暨颁奖典礼在浙江理工大学举行，至此，历时5个月的大赛圆满结束。在本次大赛中，浙江大学荣获优秀组织奖，共获得16项金奖。其中，ZJUI参与的团队获国际赛道金奖1项、铜奖1项。由ZJUI机械工程专业2020级本科生刘潜起负责，胡嘉骏、李展鹏、邬飞扬、张智博等组成的团队的“‘生息’流式样本制备仪”项目获金奖，由计算机科学与技术学院学生立项，ZJUI苏畅、林紫奕、郭舒涵、周锦程、阮煜程等学生参与的“云链知坊 | 区块链教育综合服务平台”项目获铜奖。

金奖团队项目负责人刘潜起回顾起参赛历程，感叹道，“最大的困难是项目初期，时间紧任务重。尽管比赛材料截止日期摆上期末考试周，但队友们都能牺牲大量休息时间，集中攻坚克难。在DDL前，甚至通宵达旦地建模和赶材料。” 虽然团队成员都未曾有过参与如此知识跨度广、团队人数众多项目的经验，协作难度特别大，但凭借着冲天干劲和齐心协力，困难也都迎刃而解了。“以赛促教”“以赛促学”“以赛促创”是互联网+创赛的宗旨，也刘潜起的参赛收获最好的写照。正是了解科研仪器国产化的国家战略和政策背景后的责无旁贷，是ZJUI、ZIBS、ZJE三个学院老师的倾囊而授，是团队成员不断自主学习，在夯实本专业知识基础上，主动学习商科、生物和医学等知识的求知若渴，助力该团队在比赛中所学习到了真本领，磨练了团队协作能力和创新创业能力。

问及ZJUI的课程培养有没有为参赛带来什么帮助时，刘潜起说，“我们这个项目几乎所有创新点和突破点都来自于ZJUI的课程体系，Computer-Aided Design课程帮助我们技术团队实现模型设计，Design for Manufacturability课程帮助我们掌握市场需求、背景调查、粗略设计、电脑辅助设计、模型制作等的产品设计流程，让我们掌握成本分析、竞品分析、专利分析、模型制作的能力——这些都是大赛评委评判的重点。此外，全英文教学也让我们能顺畅阅读国外竞品的英文专利、技术文件和论文，迅速了解行业的前沿技术。”

“该项目充分体现了国际校区的学科交叉的独特性和优越性，展现了校区三个学院的有机融合，闪耀了交叉创新所进发出的强烈火花。”金奖团队指导老师、ZJUI研究员胡欢老师坚信，在校区各单位的通力合作下，未来会有更多优秀的创业成果诞生。

本届大赛由浙江省教育厅、共青团浙江省委员会、浙江省科学技术协会、浙江省学生联合会主办，浙江理工大学、中国建设银行浙江省分行承办，浙江科技学院协办。自3月份全面启动以来，共有全省125所学校、4.65万个项目、35.9万人次参赛，全省高校参赛率达到26.18%；国际赛道共有来自124个国家和地区，1536个项目、5500多人次参赛。

时间：04/08/2022　记者：薛倩、叶晨晨　摄影：浙大团委、获奖团队

我院钱超研究员《Nature Communications》发文：利用增益超表面打破基本的散射极限

时间：03/08/2022　记者：钱超课题组　摄影：钱超课题组

近日，ZJUI钱超研究员联合国内外研究者利用增益超表面打破基本的散射极限，并揭示了散射的时域工作原理。相关成果以“Breaking the fundamental scattering limit with gain metasurfaces”为题发表在国际著名期刊《Nature Communications》。

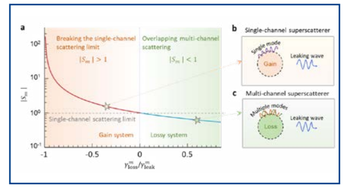
自由操控电磁散射是一项极具挑战性的研究课题，早至1871年，Rayleigh、Raman和Mie等科学家们就对光散射现象开展了研究。其中，增强微粒的散射由于可以提高光分辨率和周围介质敏感度，在光伏发电和生物传感成像等领域具有重要应用前景。在电磁隐身方面，我们可以设想将小型无人机伪装成超大型无人机，以此欺骗敌人的探测系统。然而，传统的变换光学和表面等离激元共振等增强散射的方法大多工作在损耗体系，物体的基本散射极限依旧存在，并不能随心所欲增强散射。

针对这一挑战，我们首次探索增益体系散射，打破传统散射的“牢笼”（图1）。根据时间耦合模理论，在增益体系中，散射极限将会失效，因此可以无限增大散射截面，在视觉效果上，有望构建比物体本身尺寸大的多的“象”。我们用窗口函数照射散射体，分析散射的瞬态响应，揭示了能量累积-平衡-释放的时域全过程（图2），发现不同散射强度的物体所需要的稳态建立时间不一样，例如，图2a中的增益散射体稳态建立时间为28.5纳秒，而图2b的损耗散射体为4.1纳秒。

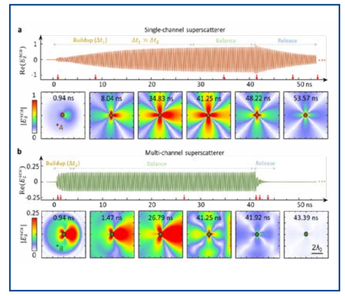
如何实验实现增益材料是打破散射极限的关键，也是当前一个极具挑战的课题。对此，我们提出一种利用遂穿二极管构造增益超表面的方法，遂穿二极管具有负电阻的性质，电磁波会被放大。以亚波长柱体为基本模型，采用Mie散射理论和逆向设计优化算法，实现其总散射截面是基本散射极限的40多倍。实验中，我们将增益散射体放置在波导中，从近远场两个角度来验证了该现象。
该成果拓展了散射系统的主流范式，为自由调控电磁散射提供了新的思路。所提出的增益超表面为验证其它奇异散射现象提供了丰富的物理平台，在可调超材料、纳米激光和非厄米隐身等方面具有广阔应用前景。

ZJUI钱超研究员为论文第一作者兼通讯作者。该项研究是与林晓研究员、李尔平教授和陈红胜教授等国内外专家合作完成。该工作获得国家自然科学基金委等项目支持。

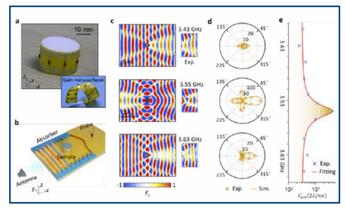
论文链接：https://www.nature.com/articles/s41467-022-32067-9



▲ 图1 打破基本的物理散射极限



▲ 图2 散射体的瞬态响应



▲ 图3 实验观测增益散射

时间：24/05/2022　记者/摄影：杨量景课题组

许超教授做客ZJUI讲堂—智能飞行：从个体到群体的演进

5月21日，浙江大学控制科学与工程学院副院长、浙江大学湖州研究院院长许超教授受邀访ZJUI并作“智能飞行：从个体到群体的演进”精彩报告。许教授围绕团队最新研究进展，同与会师生进行深入交流。本次报告由ZJUI院长李德纹教授主持。

此次主题报告以空中机器人（尤其是多旋翼飞行器）是导航、控制与制导以及智能机器人技术研究的理想载体为切入点，围绕浙江大学FAST实验室关于未知拒止条件下自主飞行、超小型全自主系统、大机动灵巧飞行实时规划、智能集群自主编队飞行等多项最新技术进行介绍。此外，结合若干实际运用场景，许超教授与参会师生展开了热烈讨论，共同探讨无人系统的实际应用和巨大价值。

许超教授获美国理海大学博士学位，现任浙江大学控制科学与工程学院教授、博导，同时任浙江大学控制科学与工程学院副院长、浙江大学湖州研究院院长。许超教授还兼任《工业与管理优化》等期刊执行主编。他长期从事“智控物理与自主机器”领域的研究工作，主要研究方向包括：1）空中机器人建模与控制及应用；2）动态系统与控制中的机器学习；3）复杂流动视觉感知与机器学习等。他在《Science机器人》、《IEEE汇刊》等国际期刊上发表论文百余篇，不少顶尖期刊均报导了其领团队攻克智能集群飞行核心技术。

我院钱超研究员《Science Advances》发文：自稳态类脑超构表面的无线信道动态管理

时间：24/07/2022　记者：钱超课题组　摄影：钱超课题组

近日，ZJUI钱超研究员联合国内外研究者提出自稳态类脑超构表面，利用智能逆向设计为驱动，率先实现在动态环境中无线信道的自由实时管理。相关成果以“Homeostatic neuro-metasurfaces for dynamic wireless channel management”为题发表在Science子刊《Science Advances》，其影响因子为14.957。

智慧城市是指利用各种信息技术和创新概念赋能城市基础设施，优化城市的服务、运营和管理，提升资源的综合运用效率。以物联网和人工智能等新一代信息技术为支撑，数据层和网络层的智能化发展迅速。然而，物理底层复杂无线信道的智能化却鲜有研究。如果能够按需定制无线信道，构建全新的电磁智能城市框架，将为智慧城市建设赋能加力（图1）。

实现该愿景的关键是如何在动态复杂环境中管理无线信道和定制电磁环境。传统无线信道工程需要部署大量高复杂性和高能耗基站，大大增加了硬件支出和维护成本，并且在实时应用中受到冗长迭代优化策略的桎梏。电磁超构表面是一类由亚波长尺寸单元构成的人工复合材料，通过巧妙设计单元结构和空间排布自由调控电磁波的传播特性。鉴于其绿色、经济高效、低损耗等优势，超构表面在隐身、感知成像、光计算等方面展示出巨大潜力，也为下一代无线通信提供了新的方案。然而，目前超构表面大多处于静态工作模式，并缺乏智能驱动，难以满足在动态环境中无线信道的自由实时定制。

课题组提出了自稳态类脑超构表面的概念，在传播过程中全局二次管理无线信道，自动满足用户需求。类脑超构表面是由大量主动式超构单元组成，每个有源元件对入射波的振幅、相位、偏振进行独立调制。微型步进电机对每个类脑超构单元施加机械驱动，该机械调控不需要连续的能量供应，具有非易失性和能耗低等优势，提高了超构表面在不稳定环境中的抗干扰能力。基于适当数量的训练数据，配合数据增强技术，建立了基于深度学习的全局逆向设计模型，搭建了无线信道与类脑超构表面排布之间的“高速通道”。

研究团队实验搭建了感知（电磁探测器）-决策（全局逆向设计）-执行（类脑超构表面）系统（图2）。先在测试集中随机选择数据进行实验测试，再将实验环境扩展至真实场景，在无需人为干预的情况下动态管理无线信道，验证了全局逆向设计的通用性和类脑超构表面的鲁棒性。

该工作结合了超构表面与深度学习，赋予类脑超构表面独立分析和解决问题的能力，为电磁智能城市基建提供了新思路。这种现场解决问题的能力有望扩展至具有高实时性要求的领域，例如动态电磁隐形和随机介质中的成像等。

范智翔博士为论文第一作者，钱超研究员为通讯作者。该项研究是与陈红胜教授、李尔平教授、郑斌副教授等合作完成该项研究。该工作获得国家自然科学基金委等项目支持。

文章链接：https://doi.org/10.1126/sciadv.abn7905

ZJUI师生联袂亮相自动化科学与工程国际舞台：高适应性可适配信息物理制造网络专题分论坛举行

时间：01/09/2022　记者：杨量景课题组　摄影：杨量景课题组

近日，ZJU-UIUC联合研究中心下设的高适应性可适配信息物理制造网络中心（Center for Adaptive, Resilient Cyber-Physical Manufacturing Networks，AR-CyMaN）在2022年IEEE自动化科学与工程国际会议（CASE 2022 ）中，成功组织了一场别开生面的专题分论坛。ZJUI师生在国际舞台上围绕先进制造、人工智能、大数据、自动化等前沿领域，汇报了自己的阶段性研究成果，并同与会专家学者进行了积极交流。

IEEE自动化科学与工程国际会议是IEEE机器人与自动化协会旗下的旗舰会议，是自动化领域研究者和实践者交流工作的良好国际化平台，也已发展为业界规格最高、规模最大的学术交流与成果展示平台。该会议每年举办一次，今年在墨西哥城举行的同时，也在中国成都举办分会场会议，还设置了线上参与的渠道，三线同步互动，保障全球与会者深度交流。

高适应性可适配信息物理制造网络专题分论坛是由AR-CyMaN中心带头人发起，旨在鼓励成员间的相互交流激发，并在高适应性可适配信息物理制造网络领域创造更多精彩，攻克更多困难。专题分论坛由AR-CyMaN　中心主任、ZJUI教授王宏伟主持，AR-CyMaN　中心联合主任、ZJUI助理教授杨量景联合主持。此次专题分论坛希望通过科技创新，赋能先进制造业，从而刺激创新创业和产业发展。具体而言，AR-CyMaN致力于研究“以自主硬软件交互实现可验证的、安全的制造过程”“通过管理使用网络和数据优化性能”“对低层、高层决策和控制的持续分析和学习”“以动态适应需求和检测到的错误或风险保障可适配”四大议题。

六场精彩纷呈的主题报告，吸引了墨西哥城、成都现场及在线平台上世界各地的与会学者。其中绝大部分的报告，都是ZJUI师生的联袂研究成果，此次专题分论坛也成为了ZJUI师生展示相关研究进展，亮相国际舞台的卓越平台。论坛中闪耀的关于前沿技术的思考和创新，也引得与会者展开了富有成效的积极研讨。

通过举办此次专题分论坛，ZJUI师生聚焦先进制造、人工智能、大数据、自动化等技术前沿，深度参与到国际高水平自动化会议中，加强了同国内外自动化领域专家学者及产业界人士的交流与合作，提升了AR-CyMaN和ZJUI在相关领域的知名度提升城市国际影响力。