

## 卷首语

### 1 以科技创新开辟发展新领域新赛道

包为民

## 专稿

### 7 2023年中国重大科学、技术和工程进展

王康友,徐丽娇,王志敏,祝叶华

## 专题:2023年科技热点回眸

### 30 2023年原子核物理科技热点回眸

马余刚

### 63 2023年超材料热点回眸

周济,于相龙

### 72 2023年天文学热点回眸

杨隽,赵桐,宋宇佳,苟利军

### 87 2023年空间科学与深空探测热点回眸

白青江,时蓬,宋婷婷,王琴,范全林,王赤

### 99 2023年行星物理学热点回眸

魏勇,柴立暉,陈一定,范开,高佳维,何飞,  
乐会军,李国主,林红磊,蔡超,戎昭金,  
宋玉环,孙伟家,王誉棋,吴兆朋,徐长仪,  
闫丽梅,尧中华,袁憧憬,乐新安,张驰,  
张辉,张金海,钟俊

### 114 2023年水污染控制与水资源利用热点 回眸

李江,张婷,潘章斌,李媛,李彦澄,丁士元,  
孟庆梅,王斌,王涛,杨超,刘保森,高军凯,  
王晶,张雅琴,王燕杉,罗阳,侯立安

### 124 2023年海洋气象研究热点回眸

王麟,王东晓,邱春华,张广隶,邹仲水,  
胡湛,戴满铭,杨桐,席紫涵,贺垠凯,  
张微微,张一,廖喜扬,姚凤朝,孟峥

### 136 2023年采油采气工程技术热点回眸

刘合,金旭,师俊峰

- 150 2023年生命科学热点回眸  
张文阳,杨昱鸽,朱恒乐,朱芳,王呈呈,  
胡荣贵
- 174 2023年小麦新基因挖掘和遗传改良  
新技术研究回眸  
叶兴国,林志珊,王轲,唐华丽,韩志阳
- 188 2023年新型光电半导体材料热点回眸  
马伟,凡群平,刘宇航,闫晗,周科,王艺林,  
赵超,毕召召,吴强,王炳俊,白海瑞
- 204 2023年镁基储氢材料研究热点回眸  
邹建新,丁文江
- 217 2023年无人机热点回眸  
段海滨,梅宇,赵彦杰,霍梦真,牛轶峰,  
王寅,袁莞迈,邓亦敏,范彦铭,朱纪洪,  
李轩,罗德林
- 232 2023年网络空间安全科技热点回眸  
冯登国,连一峰
- 245 2023年量子信息热点回眸  
李传锋
- 266 2023年生成式AI大模型发展热点回眸  
邓佳文,任福继
- 286 2023年全同态加密研究热点回眸  
范瑞琦,陈铭志,牛鑫丽,董文阔,李晓霖,  
刘硕,刘静,赵明,蔡嘉跃,闫闾,朱树永,  
郑珂威,徐鹏,郝沁汾,孙凝晖
- 296 2023年扩展现实(XR)热点回眸  
范丽亚,马介渊,刘希涛,王祎银,孙菁雨
- 306 2023年城市AI研究热点回眸  
姚冲,甄峰,席广亮
- 314 2023年工业控制系统安全热点回眸  
程鹏,张镇勇,车欣,陈积明

## Foreword

- 1 Opening up new fields and tracks by science and technology innovation ..... *BAO Weimin*

## Special to S&T Review

- 7 Top advances of science, technology and engineering from China in 2023 ..... *WANG Kangyou, XU Lijiao, WANG Zhimin, ZHU Yehua*

## Exclusive: Science and Technology Review in 2023

- 30 Annual review of the advances in nuclear physics ..... *MA Yugang*  
63 Hotspots of metamaterials research in 2023 ..... *ZHOU Ji, YU Xianglong*  
72 Top astronomy events in 2023 ..... *YANG Jun, ZHAO Tong, SONG Yujia, GOU Lijun*  
87 Review of 2023 global space science advances ..... *BAI Qingjiang, SHI Peng, SONG Tingting, WANG Qin, FAN Quanlin, WANG Chi*  
99 Review of planetary physics in 2023 ..... *WEI Yong, CHAI Lihui, CHEN Yiding, FAN Kai, GAO Jiawei, HE Fei, LE Huijun, LI Guozhu, LIN Honglei, QI Chao, RONG Zhaojin, SONG Yuhuan, SUN Weijia, WANG Yuqi, WU Zhaopeng, XU Changyi, YAN Limei, YAO Zhonghua, YUAN Chongjing, YUE Xin'an, ZHANG Chi, ZHANG Hui, ZHANG Jinhai, ZHONG Jun*  
114 Hot spots of water pollution control and water resource utilization in 2023: An overview ..... *LI Jiang, ZHANG Ting, PAN Zhangbin, LI Yuan, LI Yancheng, DING Shiyuan, MENG Qingmei, WANG Bin, WANG Tao, YANG Chao, LIU Baosen, GAO Junkai, WANG Jing, ZHANG Yaqin, WANG Yanshan, LUO Yang, HOU Li'an*  
124 Review of hotspots of marine meteorology in 2023 ..... *WANG Lin, WANG Dongxiao, QIU Chunhua, ZHANG Guangli, ZOU Zhongshui, HU Zhan, DAI Xiaoming, YANG Tong, XI Zihan, HE Yinkai, ZHANG Weiwei, ZHANG Yi, LIAO Xiyang, YAO Fengchao, MENG Zheng*

- 136 Annual review of advances in oil & gas production engineering technologies ..... *LIU He, JIN Xu, SHI Junfeng*  
150 Research highlights of bioscience in 2023 ..... *ZHANG Wenyang, YANG Yuge, ZHU Hengle, ZHU Fang, WANG Chengcheng, HU Ronggui*  
174 Annual progress on new gene characterization and novel technology development for wheat genetic improvement in 2023 ..... *YE Xingguo, LIN Zhishan, WANG Ke, TANG Huali, HAN Zhiyang*  
188 Hot spots review for new photovoltaic semiconductor materials in 2023 ..... *MA Wei, FAN Qunping, LIU Yuhang, YAN Han, ZHOU Ke, WANG Yilin, ZHAO Chao, BI Zhaozhao, WU Qiang, WANG Bingjun, BAI Hairui*  
204 Review of research hotspots in magnesium-based hydrogen storage materials in 2023 ..... *ZOU Jianxin, DING Wenjiang*  
217 Review of technological hotspots of unmanned aerial vehicle in 2023 ..... *DUAN Haibin, MEI Yu, ZHAO Yanjie, HUO Mengzhen, NIU Yifeng, WANG Yin, YUAN Wanmai, DENG Yimin, FAN Yanming, ZHU Jihong, LI Xuan, LUO Delin*  
232 Review of 2023 cybersecurity technology hotspots ..... *FENG Dengguo, LIAN Yifeng*  
245 Memorable sounds of quantum information in 2023 ..... *LI Chuanfeng*  
266 Review on hot topics of large generative AI models ..... *DENG Jiawen, REN Fuji*  
286 Annual review of advances of full homomorphic encryption technology ..... *FAN Ruiqi, CHEN Mingzhi, NIU Xinli, DONG Wenkuo, LI Xiaolin, LIU Shuo, LIU Jing, ZHAO Ming, CAI Jiayue, YAN Wei, ZHU Shuyong, ZHENG Kewei, XU Peng, HAO Qinfen, SUN Ninghui*  
296 Review on hot spots of extended reality(XR) in 2023 ..... *FAN Liya, MA Jieyuan, LIU Xitao, WANG Yiyin, SUN Jinyu*  
306 Review on urban AI hotspots in 2023 ..... *YAO Chong, ZHEN Feng, XI Guangliang*  
314 Hotspots of industrial control system security in 2023 ..... *CHENG Peng, ZHANG Zhenyong, CHE Xin, CHEN Jiming*